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TRAUMATIC PSYCHOSES.
A STUDY OF FIFTY COMMITTED CASES.*

By CLARENCE A. BONNER, M. D.,
Superintendent,

AND

LOIS E. TAYLOR, M. D.,
Danvers State Hospital, Hathorne, Mass.

The commonness of head injuries in this time of rapid transportation prompted the preparation of this article, which has to do especially with those head injuries which later have led to the development of psychoses. Since 1900 there have been numerous contributions to the subject, but in 1903 Adolf Meyer¹ called attention to a classification of the traumatic psychoses that has been useful and eminently satisfactory. He specified clinical types as follows with certain sub-headings that have been omitted here:

- A. Traumatic delirium.
- B. Traumatic constitution.
- C. Post-traumatic mental enfeeblement.
- D. Other types.

The diagnosis in the following cases has been restricted to those showing a psychotic reaction brought about by brain or head injury as a result of force directly or indirectly applied to the head.² Throughout the literature expressed in various ways by different authors is the uncertainty concerning the relationship between the force applied and its subsequent action upon the brain. Wechsler³ says: "It is well-known that a person may receive a severe blow

* Read at the ninety-first annual meeting of The American Psychiatric Association, Washington, D. C., May 13-17, 1935.

¹ Meyer, Adolf: "The Anatomical Facts and Clinical Varieties of Traumatic Insanity."

² Statistical Manual for Use of Hospitals for Mental Diseases.

³ Wechsler, I. S.: "Trauma and the Nervous System." Journal of the American Medical Association, February 16, 1935.

to the skull and sustain no fracture and no injury to the brain; he may receive a comparatively light blow and sustain both fracture of the skull and injury to the brain; he may sustain a fracture and no brain damage; he may have no fracture and yet have severe injury to the brain. A person may even receive no direct blow and still suffer grave cerebral injury." Hengstler⁴ describes it in this way: "In the consideration of what actually happens to the intracranial contents in a head injury, one must learn two vitally important facts: 1. A very bad brain injury may occur without a fracture of the skull. 2. Extensive skull fractures may take place without any actual injury to the brain or its coverings." Allen⁵ says in part: "Let us remember that we are interested in the amount of brain injury and that the presence or absence of fracture of the skull is of importance largely from the amount of present or future injury to the brain which it may cause."

This presentation is based on the study of 50 cases committed to the Danvers State Hospital and diagnosed traumatic psychoses. These comprise the entire group of such cases admitted during the last 16 years and make up about one-half of one per cent of the total number of first admissions. This fact indicates the relative rarity in occurrence of this form of psychosis.

There were 45 males and 5 females in this series. Nearly one-half of these cases were the result of automobile accidents, less than one-third were due to falls, a few to direct physical violence, and the others to miscellaneous accidents.

The greater number of the patients appear to have had a normal personality and good social adjustment, while 12 showed such defects as noticeable irritability or seclusive tendencies. The characteristics of the remaining few could not be determined from the records.

With the single exception of a lawyer, all of these patients were either middle-class tradespeople or laborers.

Nine of the cases were found to have used alcohol excessively prior to their injury and in half of this number, heavy drinking was probably directly responsible for the accident. In the remaining cases over-indulgence in alcohol was not a definite factor in

⁴ Hengstler, W. H.: "The Neurological Aspect of Head Injuries." Minnesota Medicine, June, 1931.

⁵ Allen, Lyman: Head Injuries; October, 1933.

the causation of the trauma. There were also two cases of morphine addiction in the series, but this factor seemed to have had little or no relation to the accident itself.

Twenty-four of these patients sustained definite fracture of the skull. An equal number had head injuries without fracture, while the remaining two had injuries to other parts of the body than the head.

In about one-quarter of the cases there was no period of unconsciousness, while in the others the unconsciousness lasted for periods varying from less than one-half hour to six weeks. The majority of the cases were included in the shorter periods of unconsciousness.

Delirium and excitement were present in nearly all of the cases.

Three of the cases were diagnosed traumatic epilepsy, and several others had one or more convulsions which, however, were not persistent.

Headache and dizziness were prominent in about one-half of the cases and persisted indefinitely in these instances.

Practically the entire number showed definitely abnormal neurological findings after admission to the Danvers State Hospital.

A persisting amnesia for the accident and the time-period closely associated with it was noted in over one-half of the cases.

As to the mental picture on admission, it was found that less than half of the patients were correctly oriented, while the majority showed more or less disorientation.

The majority of the cases gave no indication of the presence of hallucinations or delusions.

The post-traumatic personality changes, as observed at the Danvers State Hospital, showed that most of the patients were affected and that the changes continued in a greater or lesser degree during their entire hospital residence.

The greater number of cases developing a psychosis did so within the first year after the accident, although six developed within five to ten years and a few within much longer periods.

The average length of stay for the cases of fracture of the skull was nearly two years. The patients with head injury remained for an average period of a little over a year and those with other bodily injury for about one month. The average length of stay for the entire group was about a year and one-half.

Thirty of the cases were regularly discharged. Nine died while in the hospital; four of these deaths were due to their injuries and the others were not due primarily to trauma. Seven of the patients are still in residence, one was transferred to another state hospital, two are on escape, and the other is away from the hospital at the present time on indefinite visit.

A social service investigation of the present condition of the 30 patients who were discharged and two who escaped from the hospital showed that eight of the patients have made an apparently complete recovery from their psychosis, 15 have improved, two have shown practically no improvement, five have died, and the present condition of the others is unknown. Of those who died it is probable in one case only that the accident was a factor in the fatal outcome.

About a third of the patients were able to resume their former work after leaving the hospital, 13 have been unable to do the particular kind of work in which they were formerly engaged, and the rest have worked irregularly or at a less complex type of employment than formerly. The most noticeable fact in this connection is that only a very small proportion of the cases with fractured skulls were able to go back to their former type of work.

In consideration of the physical health of these cases, we find that one-half of them have enjoyed good health since leaving the hospital; that the five who died were not in good health before their final illness; and that the others have been fairly well, but obliged to spend some time in general hospitals.

Four of the patients who were intemperate users of alcohol before their accidents continued in the same way after leaving the hospital. Three who were not heavy drinkers before became so afterwards, and one of the drug addicts continued the use of morphine.

The cases of traumatic epilepsy have had periodic convulsions since discharge.

The presence and absence of headache and dizziness as complaints are about evenly divided among the patients.

Concerning mental symptoms since discharge, it is to be noted that only a few still show abnormal findings, the majority being apparently quite sound mentally. One patient has a disturbance of language ability. Formerly he spoke both Polish and English,

but now he has lost completely the ability to speak his native tongue.

As to personality changes, about one-third show a marked increase in irritability, a few exhibit varying degrees of irresponsibility, and the rest have evidently regained their previous personality makeup.

Only five of the cases still show evidences of neurological sequelæ in paralyses, anosmia and other manifestations.

The factor of insurance settlement apparently plays very little, if any, part in the consideration of these cases.

A satisfactory social adjustment on the same level as before the accident has been made by over half of the cases. Seven of the patients have failed to adjust even fairly well and in the others the social adaptation is satisfactory, but on a lower level than formerly.

SUMMARY.

I. This study brings out the rarity with which traumatic psychoses occur, as our series covered a period of 16 years and averaged only one-half of one per cent of first admissions to the hospital.

II. In comparison with the severity of the psychosis shown, the duration of stay in the hospital and subsequent adjustment, both social and economic, is better than might be expected, with the exception of the cases of post-traumatic mental deterioration, which usually require continued hospital care.

III. The factor of over-indulgence in alcohol has a definite relation both to the causation of the accident and to the adjustment of such patients after leaving the hospital. The adaptation is consistently on a lower level than in the cases in which alcohol is not used excessively.

IV. The occupational limitation of our patients to the classes of tradespeople and laborers may somewhat nullify the optimistic outlook as to social and economic readjustment, for naturally their rehabilitation is not on a high plane. The one case of a professional person showed that he was unable to resume his law practice and former social activities. It is very possible that head trauma may have a more disastrous effect on those who have formerly engaged in professions or more intellectual and specialized occupations than

on those whose economic life has been more one of routine and manual labor. The realization, however, that the greater part of our population is made up of tradespeople and laborers justifies the expectation that a reasonably satisfactory recovery from a traumatic psychosis will be made in the majority of cases.

V. The type of injury sustained seems to play an important part in the adjustment of the patient to his former surroundings. The cases of fracture of the skull are less apt to readjust socially than the ones with head injury without fracture and are markedly less able to resume their former occupations than the latter. This should be an important consideration in prognosis.

VI. The most common of the sequelæ of traumatic psychoses appear to be: continued irritability; headache; dizziness; and, to a lesser extent, irresponsibility, with impaired judgment. In the deteriorative forms, we find immaturity and disturbances of the intellectual faculties.

VII. While it is true that the traumatic psychoses, in proportion to the other psychoses, are relatively rare, much can be done for them in the nature of prevention by modern methods of treatment that have been so well set forth in the new literature on the subject.

VIII. It would seem that but a small proportion of head injuries develop psychoses. It is well-known, however, that they do not escape entirely from mental or nervous defects and that a huge number constantly develop the neuroses, which ordinarily remain as neuroses and do not develop into psychoses.

DISCUSSION.

DR. ROBERT M. ROSS.—One of the findings of Dr. Bonner and Dr. Taylor is that the incidence of traumatic psychoses is low, but it is an important one-half of one per cent. It will no doubt become increasingly so. Those of us who have been obliged to give expert opinion in courts of law, keenly feel the need of more definite findings. Although the group reported is limited to 50 cases, there is a considerable amount of valuable data given and I feel we owe the authors a vote of thanks for their painstaking work.

The social service follow-up data constitutes a distinct contribution and covers 60 per cent of the entire group.

There is much optimism as to prognosis in this report. In the period covered there were only nine deaths. Sixty per cent were found suitable for dis-

charge after a comparatively short hospitalization. Forty-six per cent of the group improved or recovered. One-third of those discharged, or 22 per cent of the whole, resumed their former occupation. One-half of those discharged, or 32 per cent of the whole, had good health at the time of the investigation.

Since there is an equal number with and without skull fracture, there is good opportunity for contrast. Although the number is not given, delirium was not confined to skull fracture cases. Skull fracture patients required longer hospitalization yet there were among them, those who were sufficiently improved to warrant discharge. It is noted as an outstanding feature that the fracture cases resumed work at a lower level. It would be interesting to know how many of the fracture cases exhibited convulsion.

The well-known viciousness of the combination of head injury with alcohol is emphasized. I would like to ask Dr. Bonner and Dr. Taylor whether alcoholic cases exhibited convulsion.

If the information is available, I would like to know the fate of the 24 per cent who exhibited prepsychotic personality defect.

Every paper that I have reviewed emphasizes the search made for neurological findings and evidence of demonstrable organic change. This is of course, highly important. In cases without fracture, with a minimum of neurological findings there have been advanced a host of theories to explain the changes noted. Dr. Israel Strauss in his recent excellent paper compiled an interesting list of them. It is always helpful to keep before us the ontology of the human brain. The mind is the product of an extremely delicate machine. There are present remnants of the primitive archipallium over which presides the much more specialized neopallium. This control is mainly in the nature of refinements of inhibition and correlation or association. In the humble lizard for example, there exists a type of sensorium; he recognizes where his food is to be found and orients himself with relation to it. He likewise has a store of memories and profits by experience to a limited extent. He exhibits reaction to emotions of fear, rage and so forth. There is even a beginning of judgment in his selection of prey and in timing his attack accurately. With the addition of the neopallium all of these primitive functions are vastly extended and refined. The primitive reactions in each sphere are inhibited and largely directed by the neopallium.

Every psychiatric worker is aware of the presence of these primitive reactions and is often surprised by their vigor. In time of crisis they assert their power, throwing off much of the higher inhibitory control. All of the refinements of the neopallium are of a more delicate nature. For their proper functioning they require nicety of timing and a vast amount of association. I wish to submit that on account of its delicacy and extreme complexity such a mechanism is easily thrown out of control. In any state of mental derangement we see confused fragments of the higher functions mingled with primitive instinctive outbursts freed from their usual inhibitions. It is so with concussion. There is marked emotional

disturbance associated with every head injury of major importance. I feel that this alone is sufficient cause to disrupt the delicate machinery of the mind, in condition of concussion, without demonstrable organic change.

When a concussion patient recovers consciousness and senses, even if vaguely, that he is out of control, this must cause excessive anxiety and terror. This state certainly further hinders resumption of normal control.

We are all familiar with the fact that stress of emotion alone is capable of disrupting the delicate associations concerned with the faculty of memory. In some instances this occurs before there has been time for cell damage due to vasomotor causation. It is frequently noted that these associations are restored following sleep and seem but little impaired. I, therefore, submit that these factors must be highly important, especially in cases without fracture with minimum neurological findings. This must have an important bearing on the good results noted in a large per cent of cases which for a time seem so seriously damaged.

This paper of Dr. Bonner and Dr. Taylor merits full discussion.

ANATOMIC CONSIDERATION IN CLINICAL INTERPRETATION OF BRAIN INJURIES.*

By IRVING J. SANDS, M. D., BROOKLYN, N. Y.

The past decade has witnessed increasing interest in brain injuries, due amongst other reasons, to (1) the steadily rising incidence of automobile injuries and fatalities; (2) the litigation resulting from various accidents; (3) industrial compensation laws; (4) the reaction to the psychogenic theories that attempted to explain most of the neuropsychiatric disorders in the World War; and (5) the unusual progress made in this period by neuropsychiatry and its allied specialties, neurosurgery and neuropathology.

The literature has been enriched by fundamental contributions on various phases of brain injuries. However, an appreciation of basic anatomic factors is essential in the interpretation of the clinical manifestations, and in the institution of effective therapy.

My own interest in brain injuries was aroused in 1917, when I was in charge of the pathological department of the Manhattan State Hospital, at Ward's Island. I performed an autopsy on a patient who had been diagnosed clinically as suffering from "allied to dementia præcox," a diagnosis both respectable and quite acceptable at that time. On removing the brain, I noticed a peculiar discoloration and abrasion of the inferior surfaces of the frontal lobes. I showed the specimen to the late Dr. Dunlap who explained the significance of the findings, and called my attention to the frequent involvement of this portion of the frontal lobes in brain injuries and to the perplexing clinical picture that ensues.

The late war furnished material which, when carefully studied, offered considerable information of value in understanding the subject under discussion. I was privileged to observe many of these patients while in military service when assigned to the staff of Ward 55 of General Hospital No. 1, New York City.¹ Later, when the out-patient department of U. S. Veterans' Hospital No. 81² was opened in August, 1922, I was able, for a period of seven years,

* Read at the ninety-first annual meeting of The American Psychiatric Association, Washington, D. C., May 13-17, 1935.

to study intensively a large number of patients who had sustained brain injuries in the war. For the past 12 years, I have performed all brain autopsies at the Jewish Hospital of Brooklyn, and a considerable number of brain injury cases were amongst them. My association with the Beth El and the Coney Island Hospitals, located on unusually congested arteries of traffic, has afforded me a most unique opportunity to examine a large number of acute brain injury cases. It is upon this experience that the following observations are made.

The brain is encased within the skull, is surrounded by the meninges, is intimately connected with the blood vessels that carry within their walls the lymphatic system of the brain (the Virchow-Robin lymph system), and is bathed by the cerebro-spinal fluid. The latter structures, developed for the purpose of affording great protection for the most specialized of all tissues, the brain, may become contributing factors in brain injuries under certain conditions in this highly industrialized civilization of ours, with its automobiles, tall buildings and firearms.

On examining the skull one is impressed with its anatomical peculiarities as a potential menace to the brain tissue. The upper surface of the orbital plates of the frontal bone contains numerous ridges which may be very sharp. The crista galli, while usually of small size, may at times be large and its edge extremely sharp. The lesser wings of the sphenoid are generally sharp, and beneath them are lodged the tips of the temporal lobes. Occasionally the inner tables of the parietal and the squamous portions of the temporal bones may contain sharp bony projections. The posterior fossa is generally free from any bony projections on its inner tables.

The dura is intimately adherent to the skull, forming its periosteum. Both in the very young and in the very old it is strongly attached to the bone. The falx cerebri divides the upper portions of the cranial compartment into two parts into which the hemispheres fit. The tentorium cerebelli divides the posterior fossa into two compartments. The incisura tentorii is intimately associated with the brain stem.

The arteries of the brain proper are more or less tortuous in their course and are able to withstand trauma. However, there are a few amongst those who have given considerable attention to

aneurysms of the cerebral vessels who claim that a blow on the head may indirectly be responsible in the formation of basilar aneurysms.³ Nevertheless, rupture of a large vessel of the brain is indeed a rare finding at necropsy. The small vessels however, are intimately connected with the brain tissue and are frequently injured. The smaller arteries of the pons arise from the posterior and lateral surfaces of the basilar artery, and are frequently torn in brain trauma.⁴⁻⁶ The dense glial membrane that separates the vessels from the brain tissue may be unusually thick in arteriosclerotic individuals, and it may tear the vessel wall from the brain tissue during an accident. The Virchow-Robin lymph space, connecting eventually with the pericellular lymph space, often ruptures at the time of the accident, causing disturbance in lymph circulation, and becoming in itself a factor in brain destruction.⁷⁻¹² The walls of the sinuses of the dura are strong and elastic, and they tolerate blows on the head very well. However, the petrosal sinuses may be contused or torn in fractures of the skull involving the petrous portions of the temporal bones. The sinuses act as a buffer between the trauma and the adjoining brain tissue. Many of the superior cerebral veins enter the superior longitudinal sinus at an oblique angle, and they are frequently contused or lacerated in brain injuries, and produce subdural and subarachnoid hematomas.

The cerebro-spinal fluid is lodged within the ventricles, the subarachnoid space and the perivascular spaces. It tends to transmit the force of a blow to distant parts of the brain. Moreover, cerebro-spinal fluid secretion is increased in brain trauma, and it causes pressure on the brain tissue,¹³ with brain degeneration.

The meninges, the falx and the tentorium, the large vessels, and the cranial nerves, as well as the anatomical peculiarities of the cranial fossæ, tend to limit the movement of the brain within its encasement. The frontal lobes are relatively free and so are the occipital lobes. The parietal and temporal lobes are more or less rigidly fixed within the skull. The brain stem likewise is more or less fixed by the meninges as well as by the cranial nerves.

The result of any blow on the head is naturally determined by the effect it has upon the brain. Other determining factors are the age of the patient, the force of the blow, the part of the brain injured, the presence or absence of fracture of the skull, the type

of fracture when present, the tearing of the meninges and sub-arachnoid bleeding. The escape of cerebro-spinal fluid is likewise a determining factor in the prognosis.

It is significant that blows on the head cause injury to those portions of the brain directly beneath and directly opposite the part of the skull struck. The frontal lobes, because of their relative freedom, and because they rest upon the orbital plates of the frontal bones, are very frequently injured (Fig. 1).* The force of the blow is transmitted to the frontal lobes, and they brush across the prominent bony ridges of the orbital surface of the frontal bones and sustain abrasion of their inferior surface. Occasionally, a prominent crista galli with a sharp edge, may lacerate one or both frontal lobes. Recently I took care of a man of 60 years, who while hanging curtains fell backwards striking his head. He was dazed, sat down to the table, drank a cup of tea and then gradually sank into coma. On examination he had rigidity of the neck, congested and edematous eyegrounds, bilateral Kernig, bilateral Babinski and bloody spinal fluid. His temperature rose to 102, his pulse was rapid, and he was in deep coma. A diagnosis of frontal lobe laceration was made. He died two days later, and at autopsy both frontal lobes were lacerated (Fig. 2), due to a prominent and unusually enlarged crista galli, striking against both lobes.

The occipital lobes are less free than are the frontal lobes, and the adjacent part of the skull hardly ever possesses any projections or sharp ridges. Moreover, the neighboring venous sinuses act as a buffer against blows directed on the skull. Therefore, the occipital lobes are infrequently injured. The anterior parts of the temporal lobes are very commonly injured because they are crushed against the sharp edge of the lesser wing of the sphenoid. The lateral surface of the temporal (Fig. 3) and parietal lobes are likewise frequently injured because these portions of the brain are rather rigidly fixed within the skull cavity, and the adjacent bone contains numerous ridges. The pons, because of its unique blood supply, its rather restricted motion, and its proximity to the incisura tentorii, is frequently the seat of injury. This is equally true of the medulla. The cerebellum, because of the smooth surface of the neighboring bone, and the buffer effect of the venous sinuses,

* Illustrations in this article are from the Department of Pathology of the Jewish Hospital of Brooklyn.

is rarely injured, except when there is a basilar fracture involving the petrous portion of the temporal bone; and in these instances, it is the cephalic surface of the cerebellum that is injured.

The first response of the brain to any acute insult of whatever nature is with extensive generalized edema. This causes increased intracranial pressure, with embarrassment of the medullary centers, and shock.

Sudden displacement of the cerebro-spinal fluid in the perivascular spaces causes considerable injury to the brain tissue and elicits marked edema. The escape of blood into the subarachnoid space is in itself responsible for considerable edema and degeneration of the brain cortex.¹⁴ Edema itself causes brain compression of the Virchow-Robin lymph spaces, and interferes with the proper functioning of that particular drainage system.

Tearing of the brain as well as the accumulation of blood within it, elicits both mesodermic and ectodermic reactions.¹⁵⁻¹⁷ Animal experimentation has established the precise mechanisms of this reaction. In the first week there is marked activity of the microglia which tends to remove all products of degeneration and destruction to the adjacent perivascular spaces and even to the vessel walls. Subsequently the macroglia appear on the scene, produce glial fibers, and the healing process is on the way. A glial scar is the end result. At least one month is necessary for this macroglial reaction to cease. The mesodermic reaction is characterized by the formation of a connective tissue scar which frequently intermingles with the glial scar.¹⁸⁻²⁰ This cicatrix tends to contract and pulls upon the adjacent brain tissue, causes irritation, and is responsible for a considerable number of the symptoms following brain injuries including the convulsive seizures. The convulsions appear generally months and even years after the initial brain injury. The scar formation tends to cause meningo-cerebral adhesions and subarachnoid fluid collections, and interferes with the proper cerebro-spinal fluid circulation and absorption. It frequently causes displacement of the ventricular system.

At necropsy the following types of brains are encountered:

1. A heavy and soggy brain, of brown or dark red appearance, exuding blood tinged fluid (Fig. 4). This type of lesion shows, clinically, nuchal rigidity, hypertonicity of the lower extremities, and bilateral Babinski, and marked delirium and excitement. The

spinal fluid may be clear or blood tinged. The brown or red appearance is due to extensive subpial hemorrhage.

2. A heavy and edematous brain, showing extensive contusions and lacerations. This type is accompanied by subarachnoid hemorrhage and by focal neurological signs such as hemiplegia and cranial nerve involvement, and by marked stupor.

3. A heavy and edematous brain showing no lacerations or contusions macroscopically, but microscopically it presents numerous punctate perivascular hemorrhagic areas, especially in the brain stem, frontal lobes, and corpus striatum (Fig. 5). It is this type which clinically shows the syndrome of cerebral concussion (Fig. 6).

4. A heavy, edematous, and blood discolored brain with laceration and contusions, and associated with subdural hematoma.

5. A heavy and edematous brain, presenting very little if any pial discoloration, and no contusions or lacerations, but accompanied by subdural blood clots.

All of these types may occur with or without fracture of the skull.

The signs and symptoms of acute brain injury will depend upon many factors,²¹⁻²³ the most important of which being the degree of disturbance in consciousness, the part of the brain injured, the presence of focal localizing signs, subarachnoid bleeding, the extent of cerebral laceration, the presence and the type of accompanying skull fracture, and the escape of spinal fluid.

The results of the treatment of acute brain injuries will depend upon the appreciation of the underlying anatomical and pathological changes, and the experience of the physician who manages the patient. Serious brain injuries are generally accompanied by shock. This must be given first consideration in the treatment of the patient. When in shock, the extremities are cold and clammy, disturbance of consciousness is marked, the pulse may be rapid or slow, and the respirations irregular and shallow. The patient should be kept in the Trendelenburg position. Heat, in whatever form, should be applied to the body and especially to the extremities. Cardiac stimulants, such as caffeine, digitalis, and camphor must be administered. Normal saline, or a 5 per cent glucose solution, should be given intravenously or by hypodermoclysis. The patient should be disturbed as little as possible. All efforts should

be directed to combat the initial shock. After the initial shock has been successfully met, a thorough neurological examination by a competent neurologist should be made. A spinal puncture should be done by a trained physician. The initial lumbar puncture, carefully done, is extremely important in establishing the presence or absence of subarachnoid bleeding, and in determining intracranial pressure. It must be remembered that spinal manometric pressure reading is not always a true index of intracranial pressure, for a very edematous brain will block the cerebral subarachnoid space, and the cerebro-spinal fluid will be prevented from reaching with full force the spinal subarachnoid space and the spinal manometer. Therefore, a spinal manometric reading after the cerebral edema has been somewhat diminished by the intravenous administration of hypertonic glucose or saline solutions, will give a more accurate estimation of intracranial pressure. Occasionally the condition of the optic discs may prove a more accurate index of the extent of intracranial pressure than the spinal manometric reading. Furthermore, spinal puncture in brain injuries that are accompanied by subarachnoid bleeding, is of tremendous therapeutic value. The withdrawal of the bloody spinal fluid minimizes the harmful effects on the brain that result from the presence of blood in the subarachnoid space, relieves intractible headache, and relieves intracranial pressure. Cerebral edema must be combatted with hypertonic glucose and hypertonic saline, and with lumbar puncture. Increased intracranial pressure causes increased venous pressure and increases cerebral bleeding. The old theory that reducing intracranial pressure will cause increased bleeding is no longer considered as valid. Subtemporal decompression for the relief of intracranial pressure in brain injuries, as advocated by some eminent neurosurgeons,²⁴ is not recommended. It does not relieve generalized edema, and in a few brains that I have examined, the decompression resulted in small herniation, and in the formation of a definite circular depression in the brain tissue adjacent to the decompression ring of the skull.

Excitement should be combatted with sodium luminal and sodium amytal administered intravenously. While it is universally agreed that morphine must be avoided in the treatment of brain injury cases, I have encountered several such patients in whom this drug alone checked their excitement and unquestionably helped to save

their lives. Careful frequent observations of the blood pressure, pulse, respiration and temperature, as well as the analysis of the type and extent of disturbance of consciousness, will enable the trained observer to institute the most effective therapy. After shock has been successfully combatted, the head of the bed should be elevated to 45 degrees, as this aids proper intracranial hydrodynamics, and lowers intracranial pressure.

It must be remembered that the early signs and symptoms of cerebral injury may be most alarming, and yet they need not be interpreted as indicating a fatal outcome. In fact many patients who are admitted to the hospital in deep coma, with definite neurological signs and evidence of markedly increased intracranial pressure, and even with subarachnoid bleeding, recover, and show no objective neurological signs when they are discharged. This is illustrated by the following case:

A young woman of 30 (No. 70340) was admitted to the Beth El Hospital April 14, 1935. She had fallen down a flight of stairs leading to the cellar. She was found in an unconscious state and was immediately brought to the hospital. On admission she was in deep coma; was bleeding from the nose and mouth; there was a hematoma of the right eye; and there were lacerations of the face and chin. There was flaccid paralysis of all extremities. She showed a bilateral Babinski; left knee jerk and left ankle jerk were a little more active than the right. The pulse was 56, temperature was 98, and blood pressure was 100/60. The left pupil reacted to light, and the right was fixed. The eyegrounds showed marked vascular engorgement. She was in shock, and measures were instituted to combat it. She remained in deep coma for 24 hours. The temperature rose to 104, the pulse to 114, and the respirations were shallow and rapid. Bilateral Babinski persisted. The right pupil still remained fixed, and the spinal fluid was bloody. She was given hypertonic glucose solution and spinal drainage. On the third day she became restless and tossed about, but was still unconscious. On the fourth day she gradually began to come out of the coma, but she was still uncooperative and resisted examination. One week after admission to the hospital she showed unequal pupils, the left larger than the right, and both reacted sluggishly. The eyegrounds showed vascular engorgement and there was edema in the left disc. Spinal fluid puncture was bloody and bilateral Babinski was present. Mentally the patient was readily aroused, but appeared dazed and bewildered, and did not respond to questions. The following week her condition gradually improved and she was discharged April 28 at the request of the family. At the time of her discharge from the hospital there were no demonstrable neurological signs. Nevertheless, she was still in a somewhat dazed condition, answered questions intelligently but slowly, and showed difficulty in perception and in association. She had a definite amnesia and

complained of headache. This patient, though in a critical condition on admission, showed marked improvement, and at the end of two weeks of hospital residence all neurological signs had disappeared.

In observing acute brain injury patients, one is often impressed with the marked improvement in the patient and the change of symptoms that occur in a week or 10 days after admission to the hospital. Nevertheless, these patients should be kept in bed for at least three weeks to a month to allow the process of repair to occur.

The relationship of fracture of the skull to brain injuries and its bearing on therapeutic measures are now well understood by those who have had experience in treating such patients. A fracture of the vault, particularly in children, may be in itself a rather salutary condition, for it enables the swollen and edematous brain to expand. Time and again we have seen children brought into wards and presenting the identical chain of symptoms; those who have sustained a fracture of the vault often cleared up much sooner than those who did not. Fractures of the base of the skull are frequently accompanied by laceration of the dura and arachnoid, subarachnoid hemorrhage, escape of cerebro-spinal fluid and cranial nerve lesions. It is in these types of fractures that the dreaded complication of meningitis occurs. Therefore, basilar fractures carry a grave prognosis. In the vast majority of cases it is advisable to postpone X-ray of the skull until the patient is well on the road to recovery, for moving the patient while in shock or in deep coma, and subjecting him to various manipulations necessary to take proper X-ray plates, is in itself harmful. Furthermore, in the vast majority of cases nothing is really gained from this procedure. Comminuted fractures of the skull do require surgical interference, and this may be instituted several days or even weeks after the initial injury. Nevertheless, there are certain types of patients in whom X-ray examination is imperative and surgical measures must be instituted as soon as the patient has recovered from shock. A trauma of sufficient degree to cause a fracture of the skull will also produce structural alterations in the brain even in the absence of demonstrable neurological signs. As a general rule it may be said that the management of brain injuries is a neurological and not a surgical problem.

Of course, the subject of acute subdural hematoma²⁵ is one which is now better understood and more frequently diagnosed.

The initial loss of consciousness followed by period of possible lucidity with subsequent increasing coma, or more commonly alterations in the depth and extent of the subsequent coma, associated with focal neurological signs, and particularly when accompanied by bloody spinal fluid and dilated and fixed pupil on one side, should lead one to the diagnosis of acute subdural hematoma. Its early recognition and immediate institution of surgical measures will save many a life.

The subject of cerebral concussion¹² is one that has caused considerable discussion and disagreement both as to the definition of the term and the conception of the underlying anatomical changes. It has also been the source of annoyance as well as confusion in medico-legal situations. The term should be employed to include those groups of cases in which a definite brain injury in the nature of multiple punctate cerebral hemorrhages, generally perivascular in their distribution, has occurred. Loss of consciousness at the time of the accident is not a necessary criterion of brain injury in this group of cases. I have repeatedly seen patients who had met with an accident, and had died from such causes as injuries to the thoracic or abdominal viscera, and who at necropsy showed numerous punctate hemorrhages particularly in the brain stem and especially in the medulla. Occasionally one meets patients who have had a definite blow on the head without even momentary loss of consciousness and yet immediately develop excruciating headache, bloody spinal fluid and neurological signs. The following case is illustrative of this condition:

A young married female of 27, while crossing the street, April 26, 1935, at 10 p. m., was struck by a fast moving automobile. She was not rendered unconscious, and walked home a distance of one block. She vomited, complained of headache, and had bleeding from the nose. A physician was summoned who advised absolute rest in bed. At midnight, her headache became unbearable and it was localized over the entire skull, but most intense in the frontal region. The pain was sharp, almost knife-like in character, steady and continuous. She also had pain in both eyeballs, and she could not open her eyes. She remained in bed for two days. I examined her on April 29, and at that time she had moderate resistance of the head to flexion, and a mild Kernig, more on the left. The left pupil was larger than the right. The right pupil reacted very poorly to light, and the right eyeground showed haziness of the nasal half of the disc. There was drooping of the right angle of the mouth. There was an exhaustible nystagmus on looking to the left. The deep reflexes were present and the abdominals were

intact. There was spontaneous extension of the right big toe. Spinal puncture resulted in a lightly bloody fluid of uniform color when collected in several test tubes, and was under 260 mm. water pressure. A diagnosis of traumatic subarachnoid hemorrhage with cerebral concussion was made, and she was sent to the Beth El Hospital (No. 70610). The blood count showed 12000 W. B. C., with 82 per cent polys. Her blood chemistry was normal, and her urine was negative. The pulse for the first two days after admission varied between 50 and 60. The temperature was 101 and respirations were 24. The inequality of the pupils, the haziness of the right eyeground, the drooping of the right angle of the mouth, the nystagmus and the extension of the right big toe persisted for five days. Repeated spinal punctures relieved the excruciating headache. The bloody spinal fluid finally cleared. X-ray of the skull showed an oblique fracture through the frontal bone on the right side extending $1\frac{1}{2}$ inches from the middle above the orbit upwards and backwards for a distance of $\frac{3}{4}$ of an inch. On May 9, she was discharged from the hospital practically symptomless.

This case illustrates very well the point in question, namely that unconsciousness is not an indispensable sign in cerebral concussion cases. It must be remembered that many patients show disturbance in, rather than loss of, consciousness, and the determination of the degree and extent of this disturbance of consciousness is a matter which the trained neuropsychiatrist can best evaluate. I have observed many patients who showed uncontrollable excitement rather than coma following acute brain injuries.

It is a matter of common knowledge that age has a definite bearing upon the prognosis in brain injury cases. While children stand it fairly well, old people do not tolerate it, and generally die as a result of it. It must be remembered that even in children the injured brain is an impaired organ that carries with it unfavorable consequences.

Brain injuries are invariably followed by a train of symptoms²⁶⁻²⁷ including headaches, dizzy spells, undue fatigability, lack of concentration, impulsiveness, irritability, periods of indifference, moody spells, loss of ambition and impairment in efficiency. Fainting spells and even convulsions may ensue. In many of these patients neurological signs may be detected on thorough examination. These symptoms are caused by glial and connective tissue scars that replace the destroyed hemorrhagic brain areas, by the contraction of the scars and their irritation of the brain tissue, by subpial and subarachnoid collections of fluid, by meningocerebral adhesions, by inadequate Virchow-Robin lymphatic system drainage, and by distortions of the ventricular system.

Frequently, these patients will show no neurological signs when examined a few months after the accident. Spinal fluid ²⁸ and encephalographic ²⁹ studies will prove very helpful. The encephalogram may prove indispensable in appraising the anatomical alterations caused by the injury. In many cases the encephalogram may disclose meningo-cerebral adhesions as well as variations in the size and shape and position of the ventricular horns. It may disclose extensive or localized cerebral atrophy or subdural hematoma. It must be remembered that the X-ray study of the skull and its intracranial contents, including encephalographic interpretations, has become a specialty in itself.

There is still a large group of cases of brain injury, especially of the type of cerebral concussion, that may not show neurological signs or even changes in the encephalogram. It is in this particular group of patients that much may be learned from studying the records of findings when the patients were admitted to the hospitals immediately after the accidents. It is a regrettable but a true fact that very few general hospitals, where most of the acute brain injury patients are treated, have adequate neurological examinations made on these patients. It would prove of inestimable value to patients, physicians and even to juries, if a proper neurological examination was made on every patient who had sustained an injury to the head.

Brain abscess and traumatic Parkinsonian syndrome ³⁰ may be delayed complications of brain injury. Post encephalitic Parkinsonian states, ³¹ and the different clinical types of neurosyphilis may be precipitated by these injuries.

The clinical pictures of acute psychotic reactions ³² complicating brain injuries are quite familiar to the average psychiatrist. The majority of these patients have received abrasions and lacerations to the orbital surface of the frontal lobes, and multiple hemorrhages and edema and degeneration in the association pathways. That brain injuries may precipitate (not cause) clinical paresis, dementia præcox or an attack of manic-depressive psychosis, is acknowledged by most psychiatrists.

The most perplexing and the most annoying of the after effects of brain injuries are the various manifestations of behavior disorders which many patients show after they have recovered ³³⁻³⁵ from the acute stages of the injury. There are so many conflicting

opinions expressed even by competent observers,³⁷ that they have become a subject matter for the cynic. I know of no other field in medicine in which so many contrary views are held by equally eminent physicians. In part, this is due to the difference in training and in experience of the various observers. A thorough training in neuroanatomy, neuropathology, clinical neurology, psychiatry and psychoanalysis is an indispensable prerequisite for the adequate appreciation of the basic principles, anatomic as well as psychological, that underlie the behavior disorders of the large groups of the post-traumatic neurotic patients. It is the neuropsychiatrist and not the superspecialist³⁶ in neuropsychiatry who is best qualified to pass opinion on these patients.

In general these patients fall into four groups:

1. Post-traumatic constitution.
2. Traumatic neurosis.
3. Traumatic hysteria.
4. Malingering.

The term "post-traumatic constitution" should be limited to the groups of patients who show neurological signs or encephalographic changes and who have headaches, dizziness, fainting spells and even convulsions. They show mood fluctuations, from apathy and indifference on the one hand to irritability and impulsiveness on the other. They lack concentration, and show marked impairment in efficiency.

"Traumatic neurosis" should be applied to those individuals who have recovered from a brain injury, and who do not show any neurological manifestations, or changes in the encephalogram, and yet they show definite changes in their personality. Prior to the accident they were pleasant and agreeable, self-supporting, and of normal biological reactions in every way. Following the accident they have become irritable, given to brooding, are restless, easily excitable, cannot maintain any sustained effort, complain of dizziness, especially when changing their posture, cannot work for any length of time, are readily fatigued, are apt to become quarrelsome, are emotionally unstable and show a worried expression. This symptomatology frequently follows the cerebral concussion type of brain injury.

The term "traumatic hysteria" should be limited to the neurotic reaction in certain people who have been in an accident, but who

have sustained either no injury or an insignificant scratch or abrasion. The trauma to which they attribute their complaints was usually an insignificant one. A careful anamnesis will usually elicit evidence of a neurotic personality, whose ego inflated its injured narcissism by blaming a trivial accident for their maladjustment in life. This group resembles the "compensation neurotics," who crowded the clinics of the Veterans' Bureau. Bad management on the part of their physician and their legal advisers, tended to fixate their symptoms. The trained neuropsychiatrist should have no difficulty in recognizing this group.

Malingering, or conscious falsification of the truth for a purposeful gain, utilizing illness as a means of obtaining monetary gain, is a subject which is known to others besides medical men. Many a physician has been fooled by the complaints of the malingerers especially when they were accompanied by corroborative evidence from their legal advisers.

SUMMARY AND CONCLUSIONS.

1. The orbital plates of the frontal bones, the lesser wings of the sphenoid, and the restricted motion of the brain within its encasement are indirect contributing causes to brain injuries.
2. Cerebral and subarachnoid hemorrhage, cerebral edema, and disorganization of the Virchow-Robin lymph system, contribute to brain destruction and degeneration.
3. Post-traumatic sequellæ are due to loss of brain tissue, meningo-cortical adhesions, contraction of scars, collections of fluid in the meninges, and interference with proper cerebro-spinal fluid and lymphatic circulation.
4. Significant brain injuries may occur without loss of consciousness.
5. Conduct disorders following brain injuries are differentiated from psychogenic behavior disorders.

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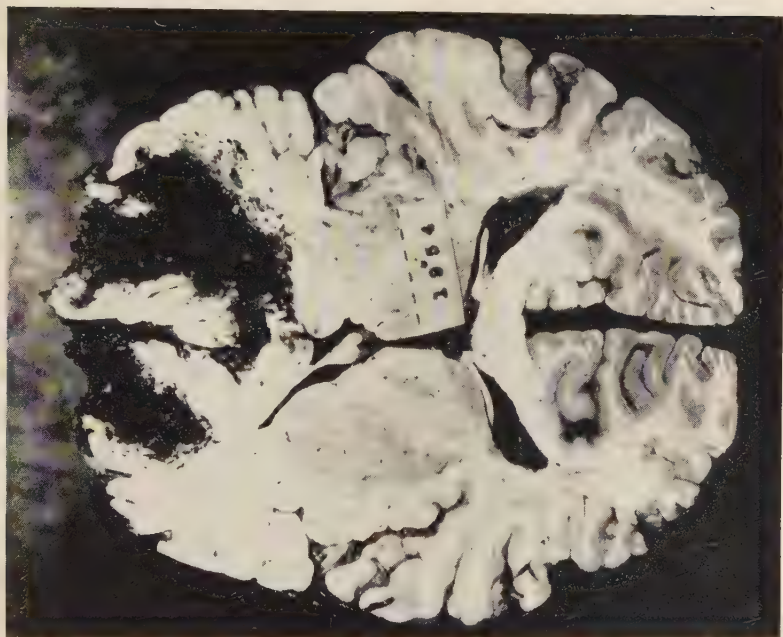


FIG. 2.—Laceration of Frontal Lobes by Prominent Crista Galli.

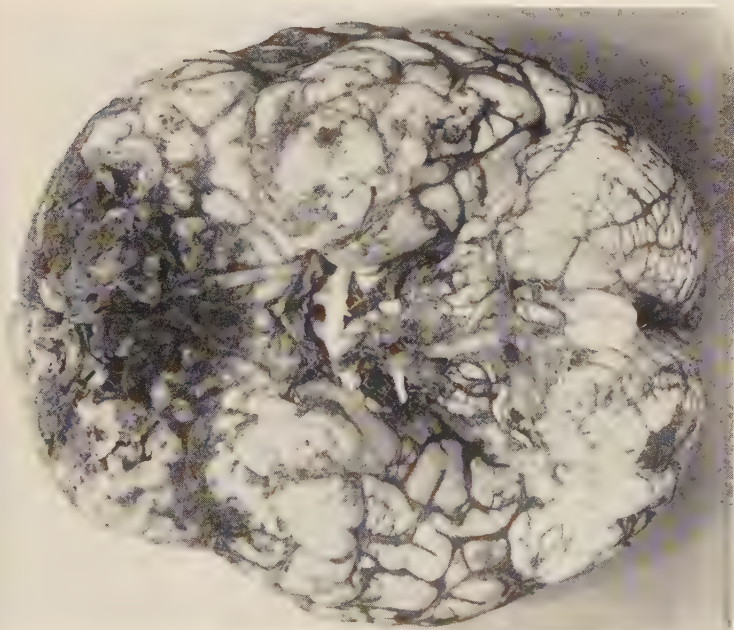


FIG. 1.—Common Site of Frontal Lobe Injury.



FIG. 3.—Common Site of Temporal Lobe Injury.

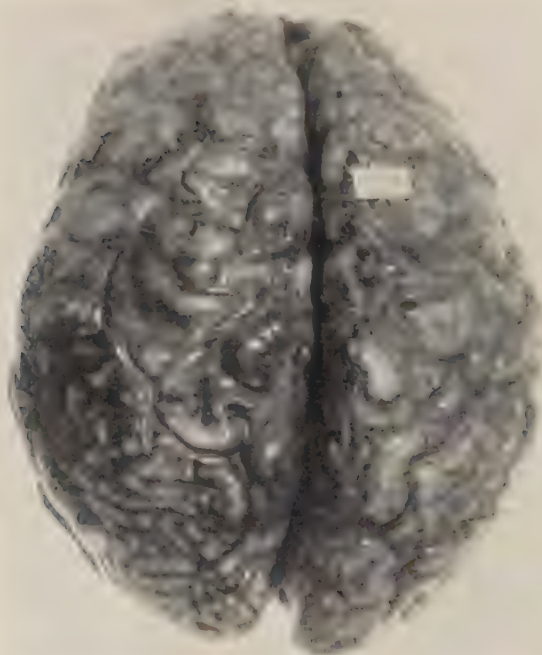


FIG. 4.—Extensive Traumatic Subpial Hemorrhage.

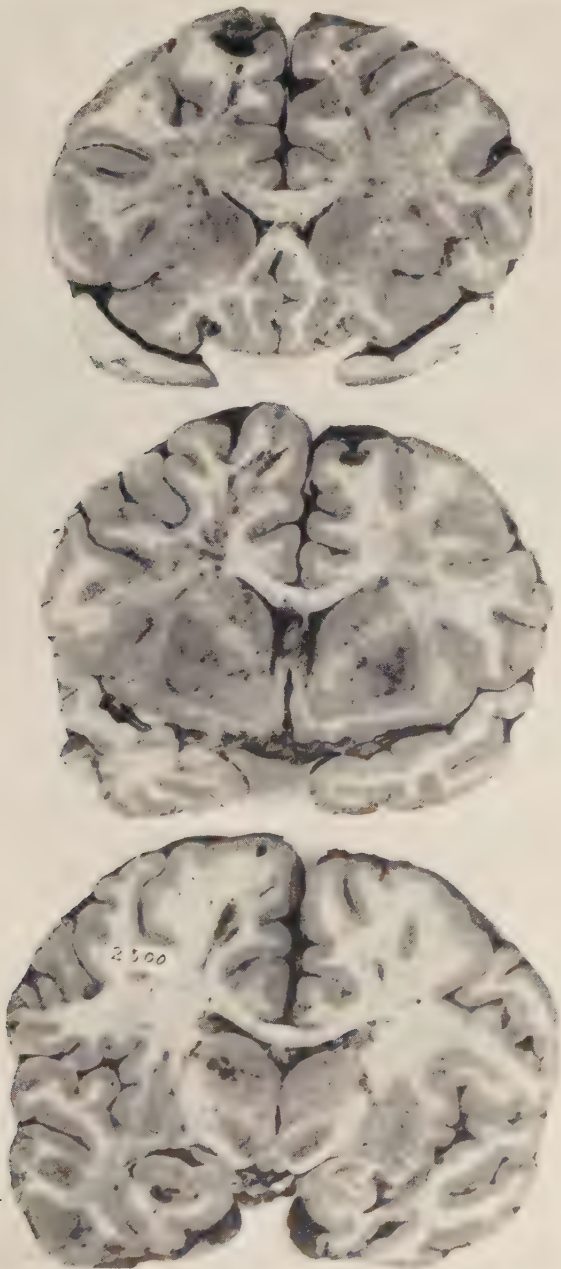


FIG. 5.—Multiple Punctate Traumatic Cerebral Hemorrhage.

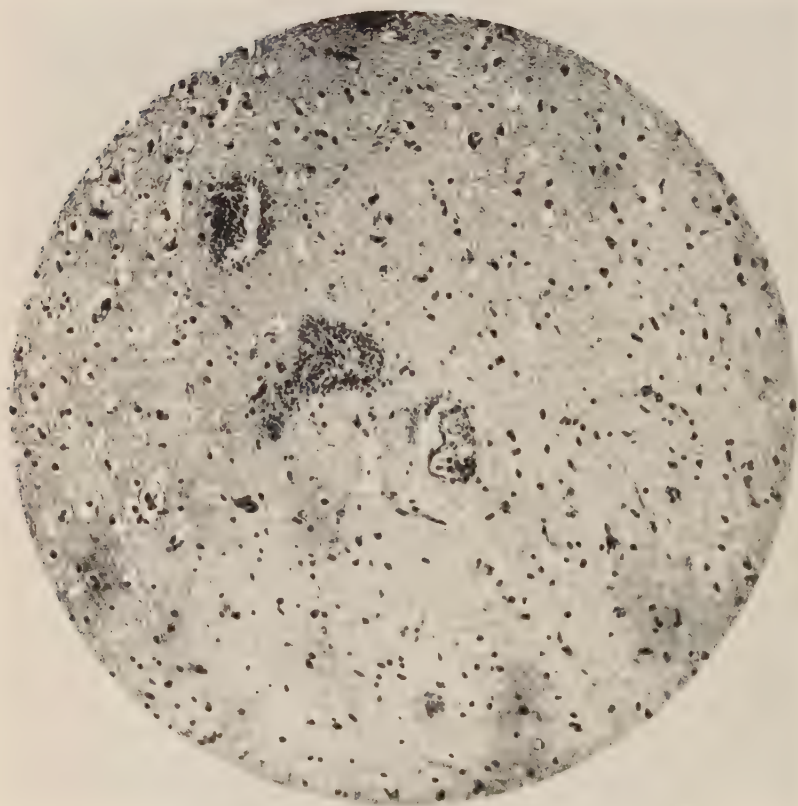


FIG. 6.—Punctate Hemorrhage in the Striatum.

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DISCUSSION.

DR. CLARENCE A. BONNER (Hathorne, Mass.).—I think the subject of traumatic psychoses is a fascinating one, particularly as Dr. Ross has mentioned in court work. My interest was particularly aroused because I found that the facts were different from the traditional understanding that I had of the traumatic psychoses, namely severe head injury resulting in a psychosis gave forth a very poor prognosis. This is hardly true according to facts and figures, even in the small group that we have studied.

Dr. Ross asks this question in relation to the persons who are addicted to alcohol: Did they suffer from convulsions? My best knowledge is that they were not in the group that had convulsive seizures.

As to the pre-psychotic personalities, in twelve of these cases, as I remember, we find that there was some personality deviation, depending upon the outlook of the examiner, that there were seclusive tendencies and some irritability in the normal life. I am unable to trace these twelve cases through to the time when they had their psychosis and I cannot say whether or not they were exaggerated.

DR LEROY M. A. MAEDER (Philadelphia, Pa.).—Dr. Sands has given a quite opportune paper in view of the increasing incidence of cerebral trauma as a result of accidents with automotive vehicles. He has emphasized the point that the first response to any acute insult to the brain is a generalized edema which causes increased intracranial pressure and which results in an embarrassment to the medullary centers and also interferes seriously with the nutrition of the brain substance.

The volume relationship between the blood and the brain, the brain substance and the cerebrospinal fluid, of course, is a thing which we have to bear clearly in mind. The volume of the blood within the arteries, the capillary bed and the veins must be maintained if cellular activity is to continue, because with the presence of pressure and the disturbance of this volume relationship, we have increased embarrassment of the medullary centers and also beginning degeneration of the brain tissue.

The proper volume relationships between brain, blood volume and cerebrospinal fluid and interstitial fluid volume therefore must be maintained at all events. In dealing with the volume relationships, we have our best indication of it in the intracranial pressure which is an index of the opposing forces of the component volumes. Therefore, an adequate treatment must have as its basis the principle of reestablishment of normal volume relationships, which means an adequate circulatory return to the injured part to maintain the cells that are still viable and to promote healing and the return of functional activity.

The conviction prevails, and I would say is becoming more prevalent, that cerebral decompression is justified in acute cerebral injury only as a matter of last resort. Physiological measures and methods of decompression are coming more and more in favor. Of course, this does not mean, where there is pressure of bone upon the brain substance, or dirt and hair in the brain substance, that surgical intervention should be postponed. But cases which show signs of subarachnoid hemorrhage, that is bloody spinal fluid, should be spared any surgical intervention as long as possible. The palliative measures should be directed toward the relief of the intracranial pressure. What measures should be taken will be indicated by a careful early record of the temperature, pulse, respiration, blood pressure, pulse pressure and the spinal fluid pressure, which makes possible the analysis and regulation of the intracranial pressure and particularly of the volume replacements.

The early administration of proper therapeutic procedures is, as Dr. Sands has emphasized, in cases of severe injury to the brain, not only necessary to insure a better chance of survival by relief of embarrassment of the medullary centers, but also in large measure determines the resultant mental rehabilitation and protection against disability.

CHAIRMAN CHENEY.—There is one point that I have in mind concerning the apparent frequency of traumatic psychoses as determined by the percentages of admissions to mental hospitals. The New York State rate of

admissions to mental hospitals of traumatic psychoses, as I recall it, corresponds to that shown by Dr. Bonner, about one-half of one per cent, but that does not indicate as I see it the actual incidence of traumatic mental conditions because the admission of such a patient to a hospital for mental disorders depends upon a good many things.

Dr. Sands has indicated from his material that the general hospitals receive a good many such traumatic cases, and I presume take care of them to the point of recovery, because those hospitals are equipped to do that, whereas only the cases would be admitted to the mental hospitals that the general hospitals were unable to care for, or where there were no general hospitals available. I imagine that in the general hospitals there are a good many cases of traumatic delirium, which, if admitted to state hospitals, would increase the apparent frequency of traumatic psychoses, and influence also the figures of recovery.

Dr. Bonner's conclusion from his cases is that apparently fracture of the skull does not give as good a prognosis, and that is somewhat different from the experience of others. Various things have to be considered in connection with that. One may assume, as Dr. Sands has indicated, that if the blow is severe enough to cause a fracture of the skull, it may very well have been severe enough to cause actual brain damage. On the other hand, there is certain evidence to indicate that in some cases at least the fracture of the skull may be a source of relief to the patient by affording the possibility of a decreased intracranial pressure, so that the patient who has a fracture of the skull may be better off as regards intracranial pressure than if he had not had the fracture of the skull.

I think we have to consider that an apparently trivial head injury, without even loss of consciousness, may result eventually in very serious mental and nervous handicaps and that one cannot tell what the future holds, and cannot by any means make a prognosis entirely upon the severity or apparent severity of the head injury at the time it occurred. I think we have all seen cases who had apparently trivial symptoms, apparently trivial blows, go on and eventually develop a chronic disabled condition in which apparently a neurosis was not the predominating factor.

The question of the recovery of patients with so-called post-traumatic constitutional personality is a point that I personally should like to have decided. I do not recall, or had not recalled until recently, such recoveries, but very recently there came back to the clinic a patient who several years ago had had what seemed to me to have all the symptoms of a rather severe post-traumatic constitution. He had been quite disabled. But he came back to us recently, apparently well, and told the story that he had rather quickly recovered when his wife died. If I had had to testify in that case, I should have said he had a very poor prognosis and that his symptoms were due to the injury. So the more I see of traumatic cases—and I don't see by any means as many as Dr. Sands—the less I am inclined to feel able to express a definite opinion as to what the outcome is going to be in any head injury case.

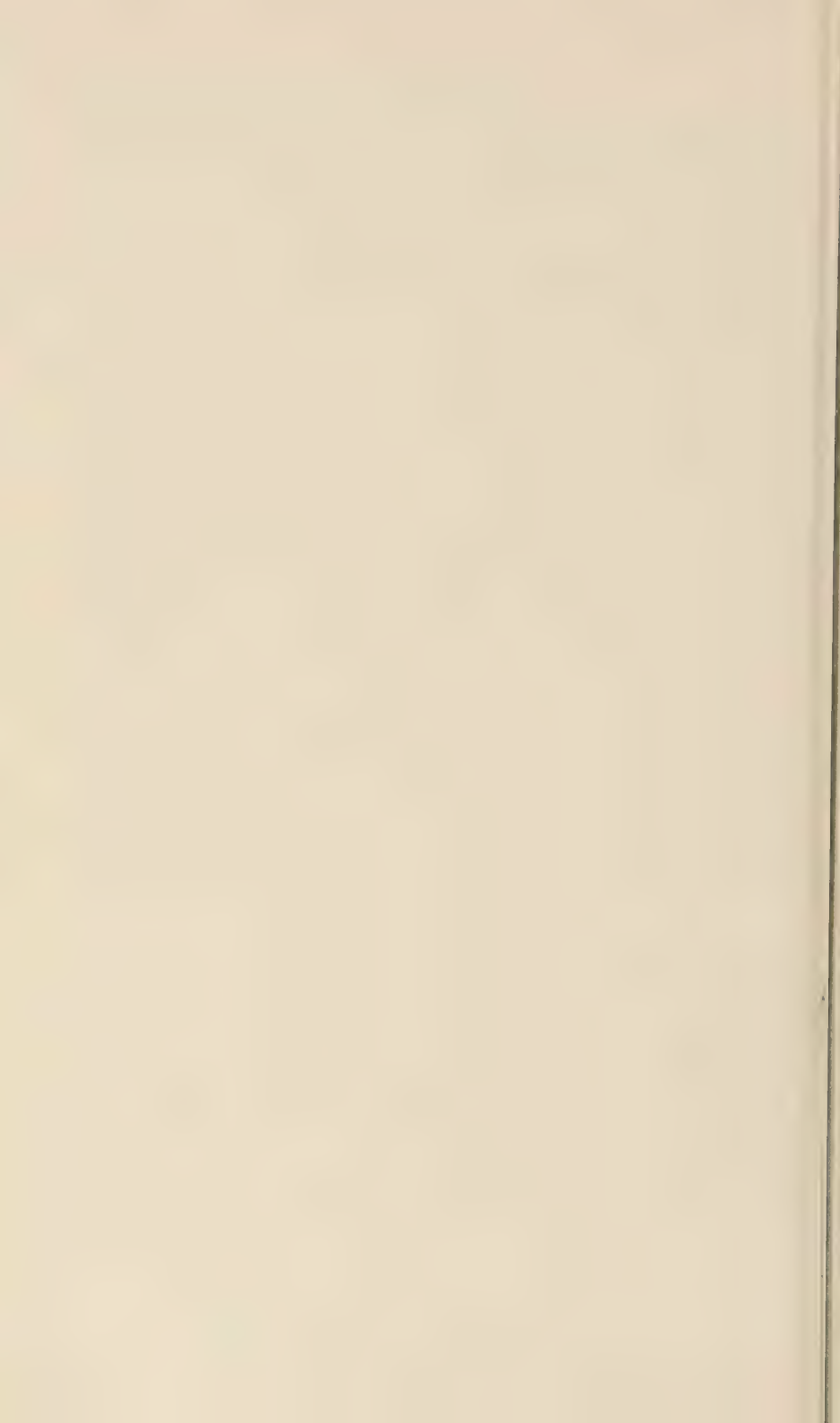
DR. ANDREW L. SKOOG (Kansas City, Mo.).—On account of the lateness of the hour I want to be brief, but these two papers that have just been presented on injuries to the brain (I say to the brain rather than the skull because I think that is all important), are meritorious of a full discussion. Now I am fully in accord with the importance of these decompressive measures without a major operation, such as giving the hypertonic solutions and repeated lumbar punctures. I could cite a number of cases, some of our own, where without any doubt repeated lumbar punctures restored the patients, and without any sequelæ.

Recently I saw a picture in a case of which I had taken an x-ray of the skull again, in which nine years later the boy was perfectly well and getting along fine in school, now in high school.

Then some years ago I had a man sent to me from a distant town. The family physician sent him in because of headache. He thought he was really malingering. After checking up on the patient and going into the history carefully, and it was only on the second check-up on the history, I discovered the patient had had a trauma to the head. He had bumped the top of his head on a rafter in his barn on the farm. He had paid no attention to it until a week later when a developing headache appeared. Now an x-ray three or four weeks after the trauma still revealed a small linear fracture somewhat near the base of the skull. This patient recovered completely after several repeated lumbar punctures. His symptoms were chiefly headache and an impairment of his behavior.

DR. IRVING J. SANDS (Brooklyn, N. Y.).—It has been my experience that fractures of the vault, when accompanying brain injuries in children, are in themselves salutary things as they aid in relieving intracranial pressure. I have followed many children with brain injuries, and those who had sustained fractures of the vault got well sooner and left the hospital much earlier than those who had not. It is understood that the fracture of the vault was not of the comminuted or depressed types. Fractures of the base of the skull, in children as in adults, add to the gravity of the prognosis because of the cranial nerve lesions and of the possible meningitis.

There is one point that I cannot emphasize too strongly, and that is the need for more adequate records of the patients' condition when they are first admitted to a hospital after an accident. It is a fact that in most of the general hospitals the notes are made by the resident surgeon who is often either too busy or in no position to appraise the damage done to the brain, and examinations by a competent neurologist are not made very soon after the accident has occurred. If better records of the neurological status of the patient could be made, they would prove of inestimable value to the patient, the physician and all others who may become involved in subsequent litigations.



STUDIES IN THE DYNAMICS OF THE HUMAN CRANIO-VERTEBRAL CAVITY.*

By JULIUS LOMAN, M.D., AND ABRAHAM MYERSON, M.D.

With the aid of new and improved technical procedures, great impetus has been given to the study of the dynamic conditions occurring within the cranio-vertebral cavity. These techniques include (1) microphotography of the pial vessels, a method perfected by Forbes¹; (2) the thermoelectric blood flow technique devised by Gibbs²; and (3) punctures of the internal jugular vein and carotid artery introduced by Myerson and his co-workers.³

By the first method a great deal of information regarding the rôle of the cerebral vasomotor system has been obtained from animal experimentation by Forbes, Wolff, Cobb, Lennox, Finesinger, Fremont-Smith⁴ and others. The blood flow recorder has been shown to have definite value in studies on the cerebral circulation both in animal and man. In man the technique briefly consists in inserting into a needle, which is within the internal jugular vein, a stylet containing an electrically heated tip and a thermo-junction in series with a galvanometer. The tip of the stylet projects into the blood stream and is heated to a temperature slightly above that of the blood. If the blood flow increases as it passes the tip, the latter is cooled, and, if it diminishes, the tip heats up. The temperature of the tip is measured by means of the thermo-junction. This method does not give absolute figures but gives the direction and general magnitude of the alterations in the speed of the cerebral blood flow. Since the internal jugular vein at the point punctured is relatively fixed in diameter, the changes in flow measured by the recorder probably indicate actual changes in volume flow as well as in velocity of flow. The technique of puncture of the internal jugular vein and carotid artery have been described elsewhere.³

In this paper we are concerned mainly with the experimental data obtained by the above cited puncture and blood flow technique

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under the conditions of postural alterations and the administration of drugs. Although a great number of the facts derived from animal experimentation on cranio-vertebral hydrodynamics may apply to man, some of these observations are not applicable to human problems and particularly for the following two reasons: (1) Because of the difference in postural habits between man and the lower mammals, it is probable that the vascular readjustments are quantitatively and qualitatively dissimilar. (2) Most of the results obtained in animals have been derived under the conditions of anesthesia and particularly that produced by ether, a drug which in itself creates marked changes in cerebral circulation.

In the human experiments to be cited later, only a local anesthetic was used. The patients were selected from the Boston State Hospital and represent cases of dementia præcox, general paresis, arteriosclerosis, and senility. In these no gross clinical changes in circulation or in cranio-vertebral conditions were present.

GENERAL PHYSIOLOGY AND PHYSICS OF THE CRANIO-VERTEBRAL CAVITY.

The physics of the cranio-vertebral cavity is unique. Although the brain and cord are invested in a rigid encasement of bone, it should be stressed that the conditions within the cavity only approximate a closed box system. This becomes immediately apparent when one considers the fact that the blood and cerebrospinal fluid which leave the cranial and vertebral cavities have many exits which communicate with the spaces outside these cavities. As a result, pressure conditions on one side of the barrier may be easily reflected to the other side. Particularly is this true as regards changes occurring in the thin-walled, elastic, cerebrospinal veins.

Enclosed within the cranio-vertebral cavity are the practically incompressible brain and cord invested by the thick outer dura and thin inner pia-arachnoid. Since these membranes are inelastic, they can play but an insignificant rôle in the maintenance of, or alterations in, the cerebrospinal fluid pressure. While there is little potential intra-dural space within the cranial cavity, the spinal cord, on the other hand, is surrounded by a loosely applied dura so that the spinal canal is relatively capacious as compared with the volume of its contents. Thus, under many conditions the spinal sub-arachnoid space may act as an emergency reservoir when cerebro-

spinal fluid is expressed from the cranial subarachnoid spaces. This is mainly made possible by the presence of the many thin-walled, easily compressible spinal veins.

The larger cerebral arteries derived from the carotids and vertebrals traverse the subarachnoid space, divide and sub-divide, and finally pierce the pia mater. As they pierce this delicate membrane, they carry with them thin invaginations of the pia, so that the subarachnoid space probably follows the arteries down to their fine ramifications in the form of the perivascular spaces. Thus, the brain may be regarded as a kind of sponge through which the cerebrospinal fluid penetrates in a microscopic stream. Once they enter the cranial cavity, the arteries largely lose their pulsations. This phenomenon has been pointed out by many workers and most recently corroborated by the skull window technique perfected by Forbes.¹ When a piece of bone is removed from the skull under normal intracranial conditions, the brain is seen to pulsate. Indirectly the almost complete lack of pulsatility of the cerebral arteries in their intact environment is indicated by the fact that although the average arterial pulse pressure is about 40 mm. of mercury, the cerebrospinal fluid pressure fluctuates only 2-4 mm. of water. Under such conditions, the brain is subject to a minimum of shock. It is only when the arterial pressure undergoes sudden and marked alterations that the cerebrospinal fluid pressure becomes altered. As the arteries spread out into the capillary bed, the pressure gradually diminishes. As low as the pressure is in the arterial capillaries, however, it must be higher than in the surrounding cerebrospinal fluid, otherwise their walls would collapse.

The larger cerebral veins, like their fellow arteries, traverse the subarachnoid space where they are in intimate contact with the cerebrospinal fluid, empty into the cranial sinuses, and thence directly or indirectly leave the skull by way of the internal jugular vein. The intracranial venous system has several peculiarities which play an important rôle in the dynamic economy of the brain: Whereas the veins elsewhere in the body are assisted by mechanisms which facilitate the onward flow of blood, the cerebral sinuses are characterized by the following features: (1) They lack valves. (2) They lack the supporting action of muscles. (3) They empty into the cranial sinuses against the direction of the flow of blood.

(4) The course of the sinuses is irregular with many twists, turns, and angles. Because of these characteristics a smooth onward flow is maintained and so the brain is protected against sudden changes in pressure that might otherwise be occasioned by sudden alterations in posture. Although the bulk of venous blood finds its way directly into the internal jugular vein, it is important to keep in mind that a certain amount of blood is returned by way of the emissary veins. When, for one reason or another, there is obstruction to the main cerebral venous pathways, these emissary veins increase in function, acting as safety valves. Indeed at times they may take over the entire drainage of the brain, as when ligation of both internal jugular veins is found necessary.⁵

The cerebrospinal fluid lies not only in intimate relationship to the vessels in the subarachnoid space and ventricular reservoirs but also penetrates the perineural spaces surrounding the cranial nerves, ganglion cells, the subarachnoid space surrounding the olfactory nerve and bulb, as far as the cribriform plate, and also surrounds the inner ear. In the spinal cord the fluid extends for a short distance along the anterior and posterior roots of the spinal nerves. The cerebrospinal fluid system in contrast with the arterial system cannot be considered to have a true circulation. Its movements and changes in pressure depend upon gravitation, changes in pressure of the surrounding veins, changes in caliber of the arteries, and only under unusual conditions upon variations in osmotic pressure.

In considering the reciprocal relationship of the venous and cerebrospinal fluid pressure, it should be stressed that it is the thin-walled cerebral veins which are important and not the cranial sinuses. Since these latter channels are enclosed in thick dural membranes, they can exert but little influence upon the cerebrospinal fluid pressure, nor can they in turn be influenced by the latter pressure. Thus, measurement of the venous pressure in any sinus reveals inadequate information regarding the exact venous conditions within the brain for the pressure in the sinus is extradural and, in a sense, extra-cranial. In contrast to this, the cerebral veins having walls which are compressible and distensible can readily communicate their pressure to the cerebrospinal fluid and, furthermore, the cerebrospinal fluid pressure can readily be communicated to the veins, so that the two pressures tend to stand

in equilibrium. Probably the closest approach to the conditions obtaining in the cerebral veins is by measurement of the pressure of the veins in the back of the eyeball, since these vessels are merely extensions of, and similarly enclosed as, the cerebral veins. Gibbs ⁶ has shown that there is a reciprocal relationship between the cerebrospinal fluid pressure and the pressure in these veins. Thus, the ocular venous pressures may be seen to follow directly the changes in cerebrospinal fluid pressure in a 1 to 1 relationship; whereas such a phenomenon is not observed when the pressure in the torcula or internal jugular vein is used as a criterion of the cerebral venous pressure.

The spinal intra-dural veins communicate with the extra-dural veins which, in turn, communicate with the body vessels, so that any variation in pressure on one side of the barrier is readily reflected to the other side and, as a result, the cerebrospinal fluid pressure is affected. This mechanism is probably best understood in a discussion of postural alterations.

POSTURAL EXPERIMENTS.

A study of the intracranial and intra-vascular changes that occur during postural alterations constitutes an important approach to an understanding of the cranio-vertebral dynamics, for during bodily positional changes all these components become definitely altered. As already pointed out, the venous and cerebrospinal fluid pressures stand in a very direct relationship to each other. In a previous communication ⁷ we have shown this relationship to hold in the various positions of the body (lateral recumbent, supine, sitting, upright, and hands-and-knees position). The changes in spinal fluid pressure occurring during these various positional alterations were considered to be mainly due to the following occurrences in the veins.

(1) The position of the right heart with respect to the neural axis. If the position of the body is such that the heart, which may be considered the true venous outlet, lies above the brain and cord (as in the supine position), the venous pressure in the dependent part of the cranio-vertebral cavity will be relatively high. If, on the other hand, the heart lies below the cerebrospinal axis (as in the hands-and-knees position), the venous pressure will be relatively low.

(2) The volume of the blood in the great veins. The general venous pressure will depend upon the degree to which the veins are distended by the blood which they contain. Anything which tends to increase the volume of blood in the abdominal and thoracic veins will tend to increase the pressure in their immediate tributaries. Thus, if the arms, legs, or viscera are below the great veins, blood will tend to accumulate in these dependent parts and the venous pressure in the great veins will be decreased. If, on the other hand, the arms, legs, or abdomen are above the great veins, the blood will tend to drain out of them and accumulate in the great veins and so increase the venous pressure.

(3) The weight of the viscera lying on the great veins and channels of cerebral and spinal venous drainage. The intestines, liver, etc., lying against the great veins will tend to compress them, impede the flow of blood and raise the venous pressure.

(4) The tension of the thoracic and abdominal muscles. Expiratory effort causes an increase in venous pressure and inspiration a decrease. Changes in intra-abdominal pressure due to contraction or relaxation of the abdominal walls are reflected in changes in venous pressure.

Thus, in the hands-and-knees position, the cerebrospinal fluid pressure is very low, for all the factors listed above are operating to lower it. Combined measurement of the jugular and cisternal pressures in the lateral recumbent, quadruped and vertical positions show that these pressures vary in the same direction and approximately to the same degree.⁷

That the arterial pressure stands in much less direct relationship to the cerebrospinal fluid pressure than does the venous pressure has been demonstrated by a great many workers in animal experimentation. Recently, Merritt and Fremont-Smith⁸ have shown in man that the level of the cerebrospinal fluid pressure is no higher in arterial hypertension than in normal subjects. The changes in arterial pressure that occur during postural alterations are of clinical as well as of physiological interest. During alterations in posture the carotid pressure as measured directly⁹ varies from about 20-40 mm. of mercury in a shift from the horizontal to the vertical position. In contrast to the internal jugular venous, and cerebrospinal fluid pressures which react very passively to positional changes, the carotid pressure shows a secondary (or compensatory)

rebound towards the horizontal level (Charts I-II-III). These changes in arterial pressure are, as pointed out by Leonard Hill, due probably to two main factors: (1) the effect of the force of gravity; and (2) the rôle of the vasomotor system. In arteriosclerotics or in deficient vasomotor types, this normal compensatory reaction following tilting is defective, so that the carotid pressure fails to hold itself at a certain level or falls to such a low level that fainting or possibly convulsions ensue (Charts IV-V). This abnormal reaction may be reproduced by the administration of vasodilator drugs when combined with upright tilting (Charts VI-VII). With such marked changes in arterial pressure, the cerebrospinal fluid falls to a low level. Normally, however, the moderate changes which occur in arterial pressure during postural alterations will not affect the cerebrospinal fluid pressure, for the venous pressure remains essentially unaffected.

The effect of the arterial and venous pressures upon the cerebrospinal fluid pressure may be explained on the following hydrodynamic basis: the cerebrospinal fluid may be considered to be enclosed by four walls⁷—(1) the dura; (2) the arteries; (3) the capillaries; and (4) the veins. The dural wall, because of its make-up and its attachments, may well be spoken of as rigid or practically rigid. The arteries, pumped up as they are to an internal pressure of from 60-100 mm. of mercury, also form a relatively rigid wall. The capillaries form a wall of lesser rigidity, and the veins a wall which is exceedingly elastic. Changes in arterial pressure will not, under ordinary physiological conditions, as already pointed out, affect the cerebrospinal fluid pressure, because whatever slight bulging of the arterial wall occurs with a rise in arterial pressure will be readily compensated for by a corresponding and partial collapse of the venous wall. The arterial pressure will then be fully supported by the arterial wall, and the change in pressure will not be transmitted to the cerebrospinal fluid. These same factors will operate to prevent a decrease in arterial pressure from being transmitted to the cerebrospinal fluid. Nor will the capillary pressure influence the cerebrospinal fluid pressure except as it changes the balance between fluid production and absorption. Simple changes in the volume of the capillary bed will be readily compensated for by changes in volume of the venous bed. On the other hand, any increase in venous pressure will cause a bulging

of the venous wall. Neither capillary, arterial, nor dural wall will support the venous pressure. The change in venous pressure, therefore, will be transmitted directly to the cerebrospinal fluid pressure.

ALTERATIONS IN POSTURE AND CEREBRAL BLOOD FLOW.

The changes in cerebral blood flow that attend alterations in posture are not generally known. By means of Gibbs' thermoelectric recorder inserted into the jugular vein changes in cerebral blood flow may be easily followed during passive tilting of subjects. In several cases we have shown that when subjects are tilted from the horizontal to the upright position, a definite slowing of cerebral blood flow occurs, and that when they are tilted to the head-down position, an increase in blood flow results (Chart VIII).^{*} Frequently, a compensatory mechanism similar to that occurring in the carotid pressure following tilting is manifested in the blood flow reaction; that is, a partial return towards the horizontal blood flow level. At times the greatest change in blood flow during upright tilting occurs during the first 15-30° with little further change when the upright position is reached. An important fact to note during tilting is that the cerebral blood flow is related directly to the change in direction of the carotid pressure rather than to that in the systemic arterial pressure (Chart IX). In fact, during upright tilting, the brachial and femoral pressures are seen to change in a direction opposite to that of the cerebral blood flow (Charts X-XI). Such changes in flow may be corroborated by the determination of the oxygen saturation in the jugular vein during tilting. In several such measurements made by the authors, the jugular blood showed consistently a definite decrease in oxygen saturation during upright tilting and a definite increase in oxygen saturation during head-down tilting, indicating respectively a decrease and an increase in the blood flow through the brain (Charts XII-XIII). This does not necessarily indicate a greater oxygen consumption of the brain in the one position than in the other, for a slower blood flow may be fully compensated for by a greater per unit consumption of oxygen, and vice versa. It is probably only when the cerebral flow is associated with abnormal falls in carotid pressure that a relative anoxemia of the brain results. Thus, in unstable vasomotor sub-

^{*} These experiments were done in collaboration with Dr. F. A. Gibbs and will be published in more detail in a separate communication.

jects, a rapid change of the body to the upright position may result in a drop in the cerebral arterial pressure and blood flow to such a low level that syncope or possibly convulsions ensue (Chart XIV). The same phenomena may occur during upright tilting after the administration of vasomotor drugs, such as histamine or sodium nitrite.

THE EFFECT OF DRUGS ON THE CRANIO-VERTEBRAL DYNAMICS.

Any interpretation of the complex responses of the cerebral circulation to drugs is very difficult, unless the various factors which are concerned in its behavior are controlled (Chart XV).

(1) *Adrenalin*.—Intravenous injections of this drug, for example, cause a great rise in cerebrospinal fluid pressure.^{10, 11, 12} This change may be interpreted as an actual increase in production of cerebrospinal fluid. When, however, it is observed that there is a simultaneous increase in venous pressure and a cerebral vasodilatation, the increase in cerebrospinal fluid pressure is readily explained on this basis. Again, vasodilatation of the cerebral vessels following intravenous injections of adrenalin¹¹ is obviously due to the great rise in arterial pressure which overcomes any cerebral vasoconstricting effect of the drug. Small doses of adrenalin, however, may be inadequate in increasing the arterial pressure sufficiently to overcome the local cerebral constricting effect of the drug. Following the intravenous injection of adrenalin, there is observed by means of the blood flow recorder an increase in blood flow through the internal jugular vein,¹³ for not only is the arterial pressure greatly increased by adrenalin but the dilated cerebral vessels now offer less resistance to the flow of blood.

(2) *Pituitrin*.—This drug causes less marked hemodynamic effects than does adrenalin. When unadulterated with depressor substances, it causes a variable rise in arterial pressure. In cats under amytal anesthesia, Wolff¹⁴ observed that local application of the drug to the pial vessels resulted in vasoconstriction, and when injected intravenously a rise in arterial pressure accompanied by a pial vasoconstriction occurred. Accompanying this reaction, there was a slight fall in cerebrospinal fluid pressure but this was soon followed by a rise in cerebrospinal fluid pressure as long as the blood pressure was maintained. In some cases, when the blood pressure rose to a great height the cerebral vessels at first dilated.

In the present authors' cases¹² in which pituitrin was injected intravenously, the following effects were noted: a fall in arterial pressure, a rise in cerebrospinal fluid pressure and jugular venous pressure. This reaction was probably due to the presence of adulterants in the extract. The rise in cerebrospinal fluid pressure in these instances obviously directly followed the increase in venous pressure and the cerebral vasodilatation. With the moderate rise in arterial pressure that intravenous injection of the pure extract causes, there is probably an associated increase in blood flow. The accompanying slight cerebral vasoconstriction¹⁴ is probably insufficient in overcoming the increase in flow produced by the rise in arterial pressure.

(3) *Caffeine*.—In unanesthetized individuals, intravenous injections of caffeine sodio-benzoate have been noted to cause regularly a fall in cerebrospinal fluid pressure.^{15, 16, 12} In the present authors' cases,¹² little, if any, change occurred in the internal jugular venous, or arterial pressures. The experiments of Finesinger¹⁷ are excellent examples of the various effects of caffeine on the cerebral circulation, according to the anesthetic used prior to the administration of the drug. For example, in animals narcotized with amytal, intravenous injections of caffeine were observed to cause a dilatation of the cerebral vessels and a rise in cerebrospinal fluid pressure. In these cases, the arterial pressure fell to low levels, and it is possibly on this basis that the above intracranial changes occur. Again, under amytal anesthesia, Finesinger noted that local application of the caffeine to the pia caused dilatation of the cerebral vessels. During ether anesthesia, on the other hand, vasoconstriction of the cerebral vessels accompanied by a fall in cerebrospinal fluid pressure regularly occurred after intravenous injections of the drug. Injections of caffeine on post-etherized cats always caused a vasoconstriction of the cerebral vessels accompanied by a fall in cerebrospinal fluid pressure. It is unnecessary to explain the fall in cerebrospinal fluid pressure on the diuretic action of caffeine, for the drop in cerebrospinal fluid pressure following its administration occurs too rapidly for diuresis to have become effective. Finesinger believes that stimulation of the respiratory system with resulting alkalosis probably explains the vasoconstricting effect of caffeine on unanesthetized subjects.

(4) *Histamine*.—This drug, when administered to an unanesthetized subject or to one under amytal narcosis causes a marked

dilatation of the pial vessels and a great increase in blood flow through the brain.^{18, 19} The arterial pressure usually shows a moderate fall. In the present authors' experiments,¹² the venous pressure as measured in the internal jugular vein remains unaltered or shows a slight fall. In cats, under amytal anesthesia, Forbes, Wolff, and Cobb¹⁹ noted a pial vasodilatation accompanied by a rise in cerebrospinal fluid pressure and in general venous pressure and a fall in arterial pressure. Weiss, Lennox, and Robb²⁰ also noted marked engorgement of the pial vessels in a patient undergoing a cranial operation under amytal narcosis. In animals prepared with ether anesthesia, Forbes and Wolff and Cobb¹⁹ observed, however, that histamine caused a narrowing of the pial vessels and a fall in cerebrospinal fluid pressure. These latter observations concurred with those of Lee²¹ who, however, ascribed the changes wholly to the effects of the histamine rather than to the combined action of this drug and ether. In unanesthetized individuals, the increase in cerebrospinal fluid pressure undoubtedly signifies a cerebral vasodilatation.

(5) *Amyl-Nitrite*.—Dilatation of the cerebral vessels following inhalation of this drug has been observed by many investigators, including Schuller,²² Mosso,²³ Hurthls,²⁴ Biedel and Riener,²⁵ Shephard,²⁶ Hirschfelder,²⁷ Raphael and Stanton,²⁸ Florey²⁹ and Leake, Loevenhart and Muehlberger.³⁰ Wolff³¹ has made the most accurate measurements of the pial vessels following inhalation of amyl-nitrite. This worker noted the following reaction in animals: a variable pial vasodilatation, a coincidental rise in cerebrospinal fluid pressure, and a drop in arterial pressure. In man the present authors noted regularly a sharp rise in both cerebrospinal fluid and jugular venous pressures accompanied by a fall in arterial pressure.¹² This reaction differs from that following histamine injections in man only in the venous pressure response. It is probable that while amyl-nitrite causes a general rise (including cerebral) in venous pressure, histamine causes only a local rise in venous pressure in those parts where vasodilatation is most marked as in the brain. Thus, measurement of the pressure in the thin-walled cerebral veins following histamine injections would probably show an increase in pressure, while at the same time the general venous pressure may be unaffected or become even lower, as observed in some of the present authors' human experiments.¹²

(6) *Ether*.—As previously stated, this anesthetic produces profound intracranial changes. In animals, Forbes, Wolff, and Cobb¹⁹ noted marked cerebral vasodilatation and a rise in cerebrospinal fluid pressure during etherization of cats. In man, the present authors¹² noted the following response to moderate ether narcosis: a sharp synchronous and an equivalent rise in both the cerebrospinal fluid and internal jugular venous pressures. Thus, it is readily understood that the action of a drug subsequently injected is obscured by the action of the ether itself.

(7) *Amytal*.—In marked contrast to ether this drug has little, if any, effect on the caliber of the pial vessels, the cerebrospinal fluid, venous pressures or cerebral blood flow in unanesthetized man (Chart XVI).¹² In post-ether cats, however, Finesinger and Cobb³² observed pial vasodilatation and a rise in cerebrospinal fluid pressure under amytal narcosis. The only definite hemodynamic response in unanesthetized subjects seems to be a moderate fall in arterial pressure.^{33,34} Because of the comparatively slight effect of the drug on the cerebral circulation, amytal as a preliminary anesthetic seems to be far superior to ether for experimental purposes.

(8) *Oxygen and Carbon Dioxide*.—In contrast to carbon dioxide, the administration of oxygen acts very inertly on the cerebral circulation. The influence of carbon dioxide almost completely obscures the effect of oxygen. Oxygen inhalations cause only slight constriction of the pial vessels and a slight fall in cerebrospinal fluid pressure. Carbon dioxide, on the other hand, shows an immediate and sharp pial vasodilatation with a marked rise in cerebrospinal fluid pressure. The arterial pressure usually shows a rise with a 10 per cent carbon dioxide mixture. These effects have been noted by Wolff and Lennox.³⁵ These authors state that an increased concentration of carbon dioxide in the blood, by increasing systemic blood pressure and by dilating the cerebral arteries, increases the speed and volume of blood passing through the brain. As a result, venous blood becomes more arterial-like. This permits a diminution of respiratory effort, a fall in blood pressure, and a decrease in caliber of the cerebral vessels. Thus, on an abnormal but constant gas mixture, an animal is able to adjust to the new conditions with a return of the cerebral circulation to its normal condition.

(9) *Insulin*.—At the height of the reaction of the body to intravenous injections of insulin (30-80 units), the cerebrospinal fluid shows a rather sudden rise followed by a sudden drop in pressure.³⁶ During the height of the rise in cerebrospinal fluid pressure, the blood sugar is at its minimum. The fall in blood sugar, however, long antedates the rise in cerebrospinal fluid pressure and returns to its normal level long after the cerebrospinal fluid pressure has resumed its original level. Whether the change in cerebrospinal fluid pressure is due purely to the hypotonic condition of the blood (hypoglycemia) analogous to the condition following the administration of hypotonic salt solutions, or is a result of a cerebral vasodilatation consequent upon the hypotonicity of the blood is unanswered at present. Since, however, there seems to be a diminished cerebral blood flow even in the presence of an increased pulse pressure³⁶ during insulin hypoglycemia indicates a cerebral vasoconstriction rather than a cerebral vasodilatation; for a cerebral vasodilatation accompanied by an increased pulse pressure would result in an increased cerebral blood flow. It is probable, then, that the increase in cerebrospinal fluid pressure during insulin hypoglycemia is due directly to hypotonic effects.

During the height of the insulin reaction, the internal jugular venous blood contains a greater percentage of oxygen than the control blood; that is, less oxygen per unit of blood is removed in its passage through the brain at the height of reaction than in the control period. This apparently diminished uptake of oxygen by the brain may be due to (1) inability to utilize its normal quota of oxygen during the hypoglycemic reaction, that is, partial anoxemia; or (2) an increased blood flow through the brain. Recent experiments by us on several subjects indicate that during insulin hypoglycemia, there is a slight decrease in blood flow through the brain (Chart XVII), a fact which would *per se* cause a greater rather than a lesser per unit consumption of oxygen by the brain. Thus, the conclusion drawn by Dameshek and Myerson³⁶ that, during insulin hypoglycemia, there is a partial cerebral anoxemia, a condition which probably accounts for the neurological manifestations of the drug, appears to be corroborated.

SUMMARY.

From the foregoing data, the following general principles regarding the cranio-vertebral dynamics may be drawn:

(1) The cerebrospinal fluid pressure directly follows either a change in venous pressure or a change in caliber of the cerebral vessels. It is only indirectly related to changes in arterial pressure. Thus, a rise in arterial pressure does not affect the cerebrospinal fluid pressure unless the venous pressure, as a result, becomes increased. The studies on postural alterations particularly stress the direct relationship between the cerebrospinal fluid and venous pressures. It may be stated that under ordinary physiological conditions, the venous pressure may be considered the chief factor in affecting the cerebrospinal fluid pressure. It is only under unusual conditions, such as severe metabolic disturbances or under such conditions set up by injections of hypotonic or hypertonic solutions, that osmosis plays an important rôle in changing the cerebrospinal fluid pressure.

(2) The cerebral blood flow is related to two important factors: (1) the arterial pressure, and (2) the caliber of the cerebral vessels. Thus, a rise in arterial pressure will result in an increased cerebral blood flow unless there is an associated over-compensating cerebral vasoconstriction. Again, cerebral vasodilatation will be associated with an increased blood flow through the brain, unless there is an accompanying marked fall in arterial pressure.

(3) During changes in posture from the horizontal to the upright, there is a fall in carotid pressure which is kept within normal limits, probably mainly by the vasomotor system. Associated with this fall in pressure, there is a diminished cerebral blood flow and a greater uptake of oxygen per unit of blood by the brain.

(4) In individuals who have unstable vasomotor mechanisms or arteriosclerosis, the assumption of the upright position may throw an overwhelming burden on the circulation, so that the carotid pressure and cerebral blood flow fall abnormally. As a result, there is a cerebral anoxemia with production of cerebral symptoms, reaching their acme in syncope or in convulsions. The administration of vasodilator drugs, combined with upright tilting, may produce similar phenomena.

(5) The response of the cerebral circulation to the administration of drugs depends upon the complex pressure flow relationship between the cerebral and general circulation. Probably the most dramatic of the drugs used in this study was insulin. Not only do moderate to large doses of this drug deplete the sugar in the blood,

but may also produce a cerebral anoxemia. That an actual cerebral anoxemia occurs during insulin hypoglycemia is indicated by the facts that although the blood flow through the brain is diminished, there is a diminution in the jugular arterial difference in oxygen content.

The above experimental data demonstrate the applicability in the human subject of the techniques of jugular and carotid punctures and the blood flow method devised by Gibbs. By these methods a great amount of information regarding not only the pressure conditions occurring within the cranio-vertebral cavity, but also regarding the metabolism of the brain may be obtained.

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LEGENDS FOR CHARTS.

CHART I.—Effect of postural alterations (horizontal to vertical head-up and vertical head-down) upon the cerebrospinal fluid pressure.

CHART II.—Effect of postural alterations upon the internal jugular venous pressure.

CHART III.—Effect of postural alterations upon the carotid arterial pressure (direct) in a young dementia præcox subject. Note the compensatory rebound following each shift of position. The arterial pressure is represented by oscillations of an aneroid manometer connected directly to the puncture needle. (When the pulse pressure is normal, the maxima are about 10 mm. Hg. lower than the actual systolic pressure. The minima represent readings much higher than the actual diastolic pressure.)

CHART IV.—Effect of postural alterations upon the carotid pressure (direct) in an arteriosclerotic subject. Note the irregular pulse pressure; the marked drop in "systolic" pressure and the poor "compensatory" rebound in pressure upon head-up tilting. At the end of the experiment when head-up tilting was repeated, the pressure continued to fall to a very low level (from 175 mm. Hg. to 60 mm. Hg.). At that point, the subject was near syncope. His circulations immediately improved when he was returned to the horizontal position.

CHART V.—Effect of sudden head-up tilting on a young dementia præcox subject who was unprepared for the maneuver. The carotid pressure fell from 98 mm. Hg. to 26 mm. Hg. at which point the subject fainted. Immediate resumption of the horizontal position resulted in quick return to consciousness.

CHART VI.—Effect of head-up tilting combined with subcutaneous injection of sodium nitrite (2 gr.). Before the administration of the drug, head-up tilting caused a moderate fall in carotid pressure followed by a good compensatory reaction. At the height of the reaction to the nitrite, head-up tilting resulted in a still greater fall in carotid pressure to 20 mm. Hg. when the subject was practically in syncope. He regained almost immediate consciousness when returned to the horizontal position.

CHART VII.—Effect of head-up tilting before and after the administration of histamine (.6 cc. intramuscular). Before the injection of the drug, head-up tilting caused a moderate fall in carotid pressure followed by a fair "compensatory" reaction. Repetition of the tilting after the administration of the histamine resulted in a marked fall in pressure to 14 mm. Hg. with no

compensatory response. The subject developed clonic movements of the head, arms and legs which quickly disappeared when he was returned to the horizontal position.

CHART VIII.—Cerebral blood flow record by means of Gibbs' thermo-electric technique. There was an increasing diminution in blood flow as the subject was tilted from the horizontal to the 15°, 30°, 45°, and the vertical head-up positions. (B.F.—blood flow; B.P.—systemic blood pressure.)

CHART IX.—Horizontal to head-up tilting. Note that the cerebral blood flow and carotid pressure fall together while the brachial pressure rises.

CHART X.—Simultaneous measurements of the carotid and brachial arterial pressures (direct method). Note that the pressures change in opposite directions during head-up and head-down tilting.

CHART XI.—Simultaneous measurements of the carotid and femoral arterial pressures. The femoral exhibits greater gravitational effect than does the carotid pressure.

CHART XII.—Internal jugular venous oxygen content in the horizontal, vertical head-up and vertical head-down positions in 8 cases of dementia præcox and 3 cases of senility. Case 6 was a dementia præcox patient who almost fainted in the head-up tilting when the O₂ content was 7.3 vol. per cent.

CHART XIII.—At "A" with the subject in the horizontal position the O₂ saturation in the jugular blood is 67 per cent. With a fall in the blood flow in the 40° head-up position, the jugular blood O₂ saturation is 61 per cent. With a still greater fall in the blood flow in the 80° head-up position, the jugular blood O₂ saturation is 59 per cent.

CHART XIV.—Effect of vertical head-up tilting on the cerebral blood flow. Same subject as represented in Chart V. Excessive response to upright tilting with production of syncope.

CHART XV.—Effect of various drugs on the systemic arterial pressure, internal jugular venous pressure, cerebrospinal fluid pressure and cerebral blood flow in unanesthetized subjects. The changes in pial diameter were observed by Forbes, Wolff, Cobb, and others in animals under the effect of amytal.

(NOTES:—Insulin: The minus sign refers to the diastolic pressure; the systolic pressure is unaffected. Amytal: The minus sign refers to the period of injection of the drug.)

CHART XVI.—The effect of intravenous injection of amytal on the cerebral blood flow. Only a slight fall in blood flow occurs during the period of injection.

CHART XVII.—Effect of intravenous injection of insulin (40 units) upon the cerebral blood flow.

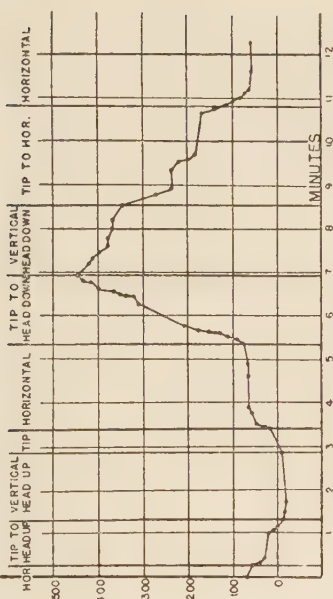
JUGULAR PRESSURE
MM. WATER

CHART II.

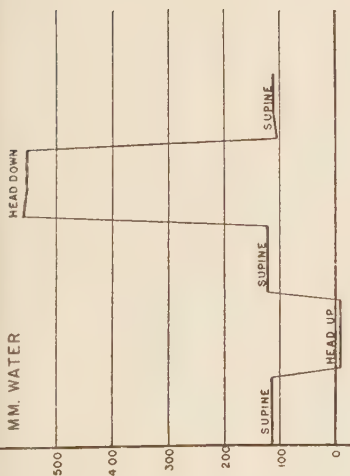
SPINAL FLUID PRESSURE
MM. WATER

CHART I.

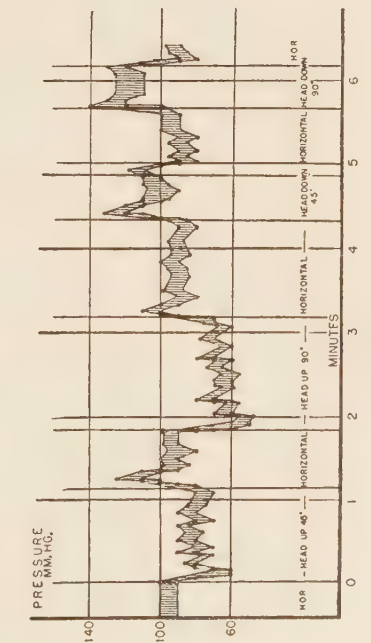


CHART III.

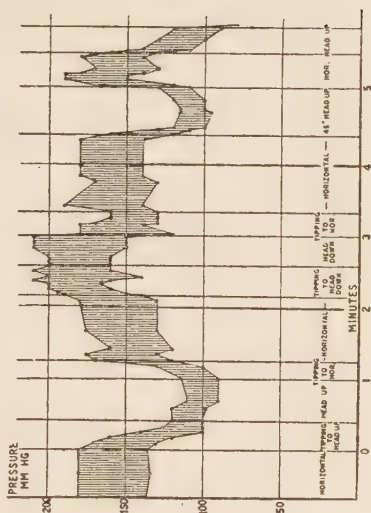
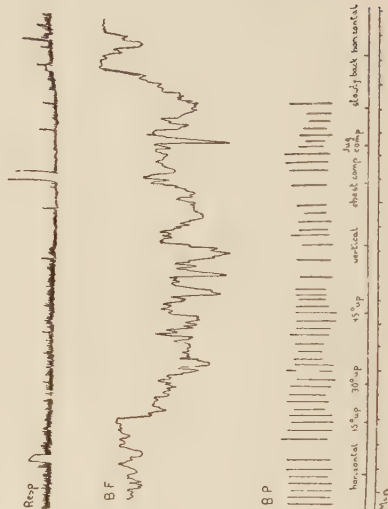
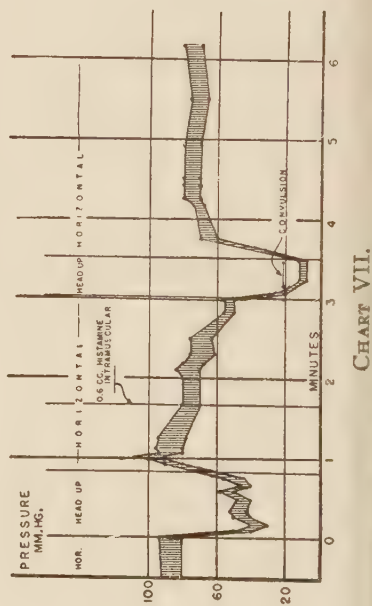
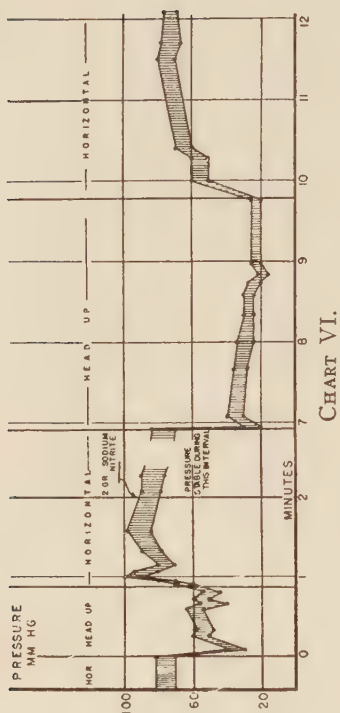
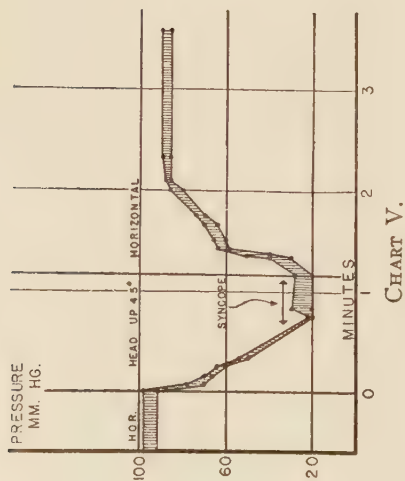


CHART IV.



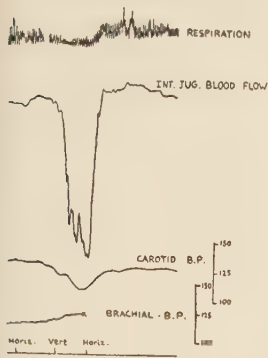
EFFECT OF POSTURE
ON BLOOD PRESSURE AND CEREBRAL BLOOD FLOW

CHART IX.

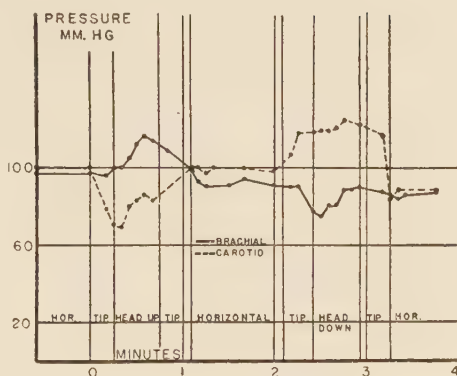


CHART X.

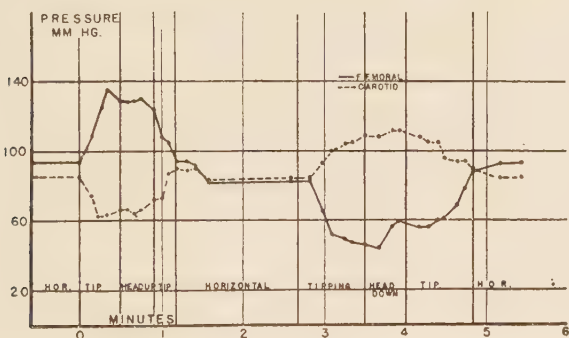


CHART XI.

OXYGEN CONTENT IN POSTURAL ALTERATIONS

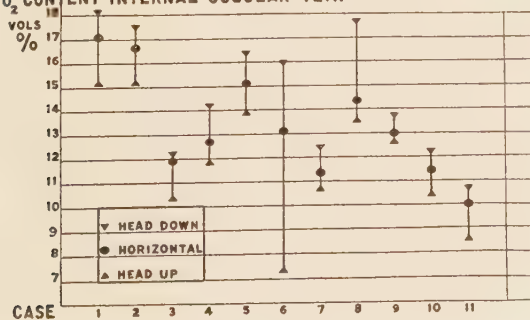
O₂ CONTENT INTERNAL JUGULAR VEIN

CHART XII.

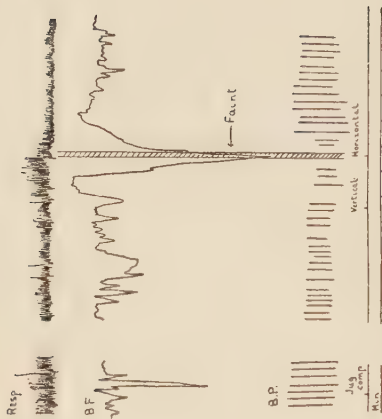


CHART XIV.

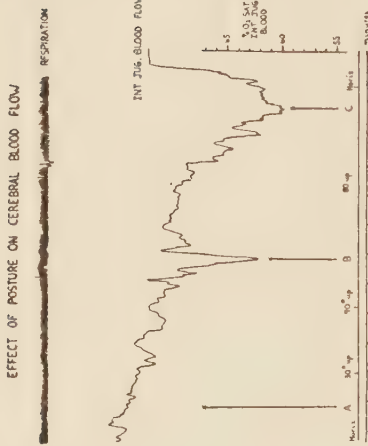
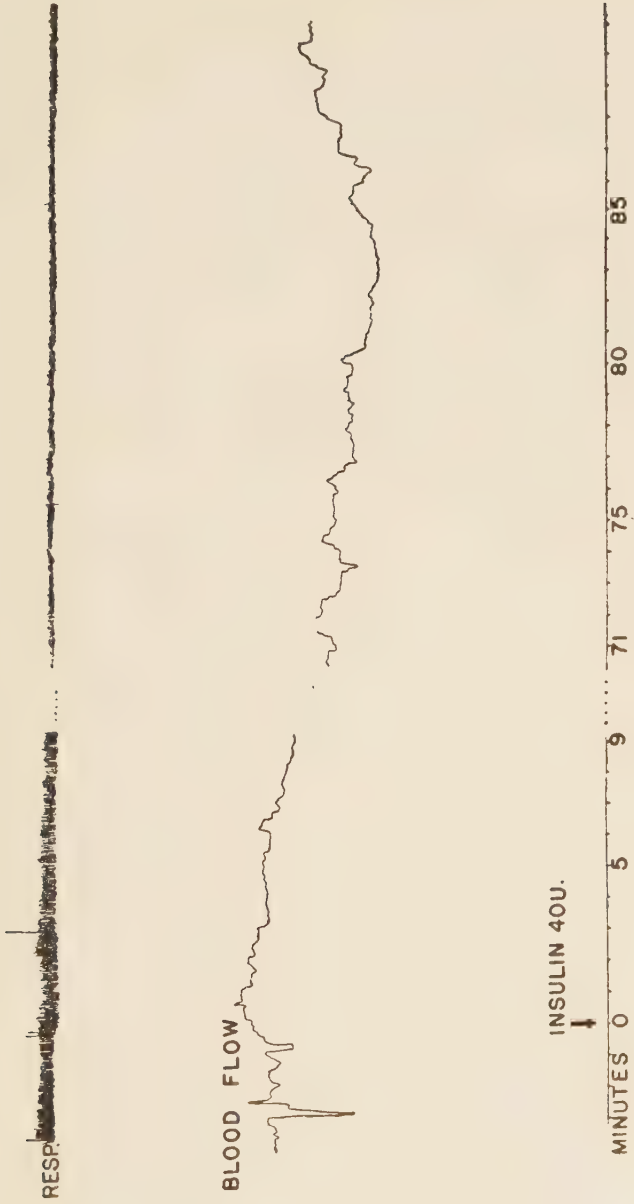


CHART XIII.

DRUG	ARTERIAL PRESSURE	VENOUS PRESSURE	C.S. FLUID PRESSURE	VESSEL DIAMETER	BLOOD FLOW
ADRENALIN	+	+	+	+	+
PITUITRIN	+	+	+		
HISTAMINE	-	0	+	+	+
CAFFEINE	0	0	-	-	-
AMYL NITRITE	-	+	+	+	+
ACETYLCHOLINE	-		+	+	+
AMYTAL	-	0	0	0	-
ETHER	-	+	+	+	
OXYGEN	-	-	-	-	-
C O ₂	+	+	+	+	+
INSULIN	-		+		



DISCUSSION.

DR. ABRAHAM MYERSON (Boston).—I want to emphasize first of all that this is not Dr. Myerson's paper except in the conception of the ideas and general correlation of the activities, that the incredibly patient, skillful work required in this procedure represents the patience and skill of Dr. Loman. When you reflect that these experiments have been carried out for six or seven years and not one patient has had an infection, that he has been putting needles in, one in the jugular field and one in the cistern, and tilting the patients around, you can see that care, skill and something approaching genius in manipulation has been used. At the same time we insist the procedure is not too difficult; *e. g.*, the jugular puncture is not an arduous technique and any man doing a cistern puncture can do any of the punctures we have used.

A further point I wish to make is that we are not looking at these experiments from their relevancy to paresis, dementia præcox or any of the psychoses. We are laying down what we believe to be a physiology of the cranial spaces in relation to blood flow, spinal fluid pressure, arterial pressure and venous pressure. We believe the relation of spinal fluid pressure to venous pressure is immediate, but there is not direct correlation with arterial pressure; that there is more or less direct relationship to the width of the capillary bed.

Now these have led us naturally to the relationship between the dynamic factors and the chemical factors and we find a relationship of importance between chemical factors such as the use of oxygen, and also as we have not designated, the use of sugar, and changes in posture and the rate of blood flow.

Dr. Loman did not have time to tell you about the elaborate experiments with insulin. In certain phases of insulin glycemia the patient sweats and twitchings appear and in some cases it goes beyond these phenomena into a near convulsive state.

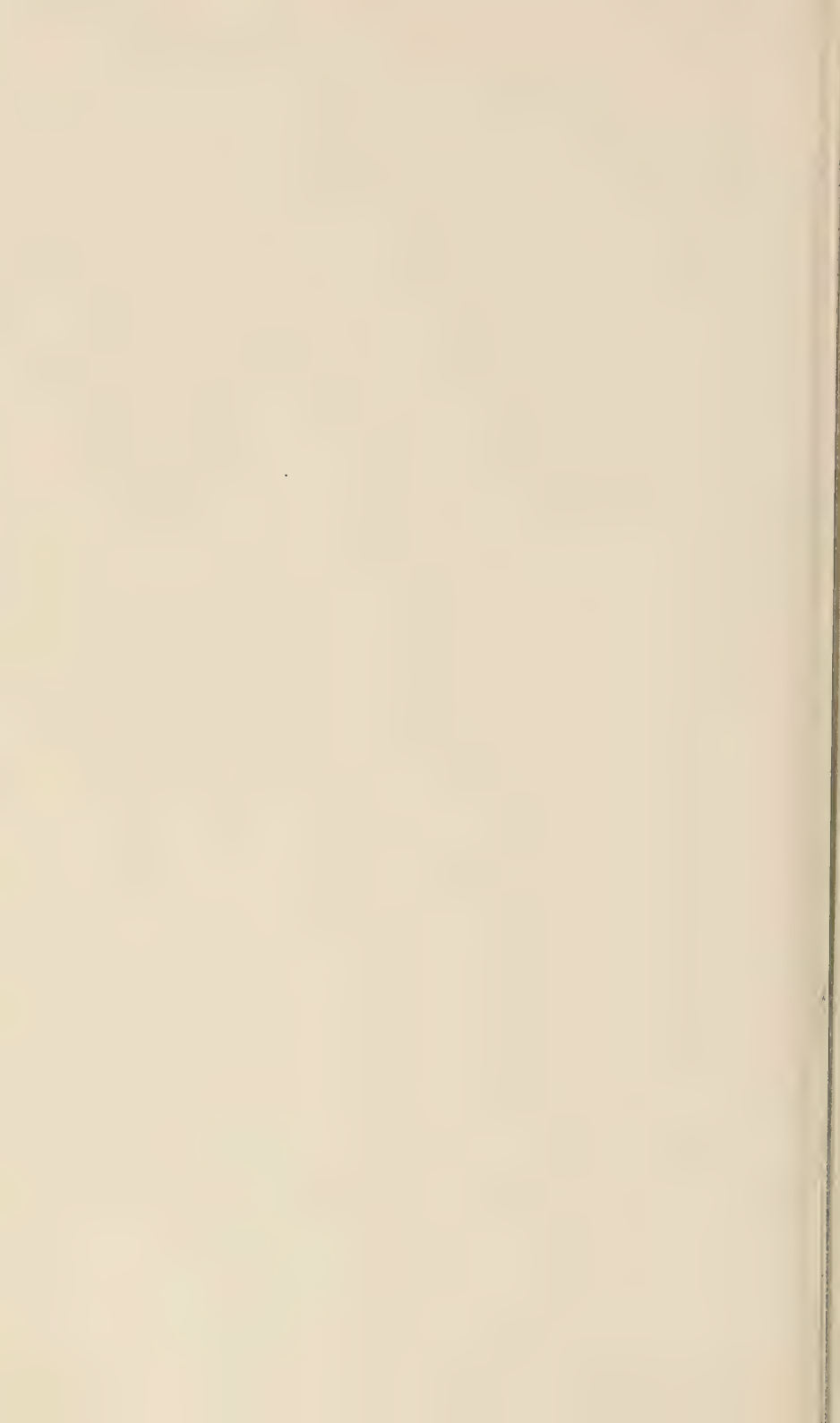
When you study what takes place at the brain, you receive some explanation. First of all, the spinal fluid pressure starts rising rapidly, then the sugar drops moderately. Secondly, the oxygen use as measured by the difference in content between the carotid artery and jugular vein is greatly reduced. At the same time, what would normally take place when the oxygen use is diminished, namely, an increased blood flow to make up for the lesser oxygen intake, does not take place and consequently there is anoxemia, and therefore there results the twitching and sweating and stupor and the sometimes semi-convulsive state.

So we have here in terms of dynamics a fairly comprehensible mechanism, an expansion of what takes place in insulin hyperglycemia.

You can compare this with what takes place in syncope as Dr. Loman's chart graphically shows, a very quick drop in the arterial pressure to about 25 to 20 millimeters of mercury, and a change in the oxygen intake, and a drop in the spinal fluid pressure takes place at the same time. Syncopes becomes thus a matter of measurable reduced arterial pressure, spinal fluid pressure and slowed-up circulation.

We are going to continue to work on the problem for a great many years. Our excuse is that this is one of the approaches to problems of mental disease. We have no hopes of telling why a person has dementia præcox, by this method, but we hope to be able to tell what takes place in the brain without involving mythical or difficult psychological interpretations but expressing it quite correctly in anatomical and mechanistic terms; not that we despise the psychological interpretations, we admire them, but we also marvel greatly at the skill necessary to reach them.

CHAIRMAN HUTCHINGS.—Dr. Myerson and Dr. Loman are to be congratulated upon this very interesting study which they have brought to the attention of the Association. The opportunity for further investigation is intriguing and it is satisfying to learn that the work is to be carried on, and I personally hope that they will find ways to record the influence of the emotions as well as of posture on the mechanics of the cerebral circulation. That will be difficult, of course, there will be obstacles to be overcome, but I have confidence in the workers in that laboratory to find the way to do it.



THE ALLEGED INCREASE IN THE INCIDENCE OF THE MAJOR PSYCHOSES.*

BY HENRY B. ELKIND, M.D.,

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AND

MAURICE TAYLOR, PH.D.,

Federation of Jewish Philanthropies, Pittsburgh, Pa.

Many authorities in the field of eugenics believe that mental diseases are on the increase, particularly those types which are alleged to be hereditary, such as dementia præcox (schizophrenia) and manic-depressive psychosis. Medical authorities, on the other hand, have held on the whole to the view that there has been no increase. Our own studies have led us to the latter view.

The objective evidence for studies of this subject are statistical data given in official reports of states or governments. It is true that a cursory examination of these data might lead one to infer increases both in the general and specific rates of mental disease.

But there is a special statistical problem in the analysis of these data, namely, the determination of the biological situation independent of hospital, administrative, and other influences, in so far as this can be done practically. Obviously, only the statistics of those states or governmental units whose hospitals are highly efficient and adequate in numbers should be used. The classification of mental disease used by them should be the same; and as many states as possible satisfying these conditions should be studied in order to be reasonably certain that the rates of incidence are fairly stable and are not due to special conditions operative in any individual state. A relatively short period of time should be chosen for study to eliminate as much as possible the influence of changing administrative policies and medical practices within a state. In our opinion, 15 to 20 years is a safe period of time to study.

* Prepared for the Committee for the Investigation of Sterilization appointed by the American Neurological Association, Dr. Abraham Myerson, chairman, and adopted in its report given at the annual meeting held in Montreal on June 3, 4, 5, 1935.

Only two states satisfy the above conditions: Massachusetts and New York. The hospitals in these states are plentiful and they are conveniently located for the individuals who need them. The general social interest in the mentally ill has been high and has not changed much during the past 20 years or so. The physicians in charge are on the whole well trained; medical standards and equipment are excellent; and administrative policies have been fairly stable during this period.

It is admitted that the available statistics suffer from one serious limitation: they do not include most of the psychoneuroses nor a large proportion of the milder forms of the other psychoses which do not require admission to a mental hospital. In addition, no good estimate is available of what proportion of the serious forms is cared for in the community, although in our opinion it is small in the states chosen for study. Nevertheless, these statistics are the best available and do measure the amount of mental disease which developed to such a point that it was necessary to remove these cases from the community.

Massachusetts figures cover a period of only 14 years; New York only 18. The classification of mental diseases used by the hospitals in these states was changed in 1916 and statistics for earlier years could not be used. In the case of Massachusetts the years 1917, 1918 and 1919 were eliminated because in those years temporary admissions were combined with first regular court admissions and could not be separated.

Rates of first admissions are utilized in this study as the best available indices of the incidence of mental diseases or of specific types in a community.* (Temporary care admissions, *i. e.*, those remaining in hospitals 10 days or less, are not included in the rates for Massachusetts for these are not available except in the most recent reports of the state.)

Charts I and II give the rates of first admissions to the state hospitals in Massachusetts (1920-1933) and New York (1917-1934). The rates plotted include total first admissions and first admissions for the following individual psychoses: (1) senile psy-

* Arithlog paper was used in making an analysis of the data in Tables I and II (see Charts I and II) in order to obtain the relationship of time-trends between the various psychoses studied. Arithlog paper lends itself particularly well to this purpose.

chosis, (2) psychosis with cerebral arteriosclerosis, (3) general paresis, (4) alcoholic psychosis, (5) dementia præcox (schizophrenia), and (6) manic-depressive psychosis. The rates also include (1) and (2) combined and (5) and (6) combined, because in these several disease groups there are difficulties and considerable error in diagnosis between them.

Adjustments for age were made in computing all the rates. For *all psychoses* the general population was adjusted so as not to include children under 15, as few under 15 are admitted. For *general paresis* it was adjusted to include those 35 years of age and over, as few paretic cases come to the attention of mental hospitals before that age. The populations in the cases of *senile psychosis* and *psychosis with cerebral arteriosclerosis* were adjusted to include only those 55 years and over because, due to the nature of these illnesses, a case very rarely comes to the attention of a state hospital before the age of 55. The populations for the other psychoses studied were adjusted to eliminate children under 15.

Chart I for Massachusetts gives a practically flat trend in the case of *all psychoses*. If anything, the trend is slightly downward from the high rate of 118 in 1922. In New York, however, there is a slight rise. But in the light of work done by other authors* dealing with the general question of the increase of mental disease, this is probably only an apparent increase. It is highly probable that the slight rise in total admissions for New York State is in large part a general reflection of the increased interest in that state during the past generation in providing better and more adequate facilities for the care of the mentally ill.

It is possible, of course, that Massachusetts has already reached the saturation point as far as commitments for mental disease are concerned and that once it has reached this point one may expect a leveling or possibly a decrease in admission rates. It is to be

* Henry B. Elkind, "The Epidemiology of Mental Disease: A Preliminary Discussion. Is Mental Disease on the Increase?" *AMERICAN JOURNAL OF PSYCHIATRY*, Vol. VI, No. 4, April, 1927.

Ellen Winston, "The Assumed Increase of Mental Disease," *American Journal of Sociology*, Vol. XL, No. 4, January, 1935.

National Committee for Mental Hygiene, *State Hospitals in the Depression—A Survey of the Effects of the Economic Crisis on the Operation of Institutions for the Mentally Ill*. 1934.

**FIRST ADMISSIONS (COURT COMMITMENTS ONLY) TO MASSACHUSETTS STATE
HOSPITALS AND McLEAN HOSPITAL: RATES PER 100,000 POPULATION
(ADJUSTED FOR AGE - SEE TABLE I) - FOR THE YEARS 1920-1933 INCLUSIVE -
- CHART I -**

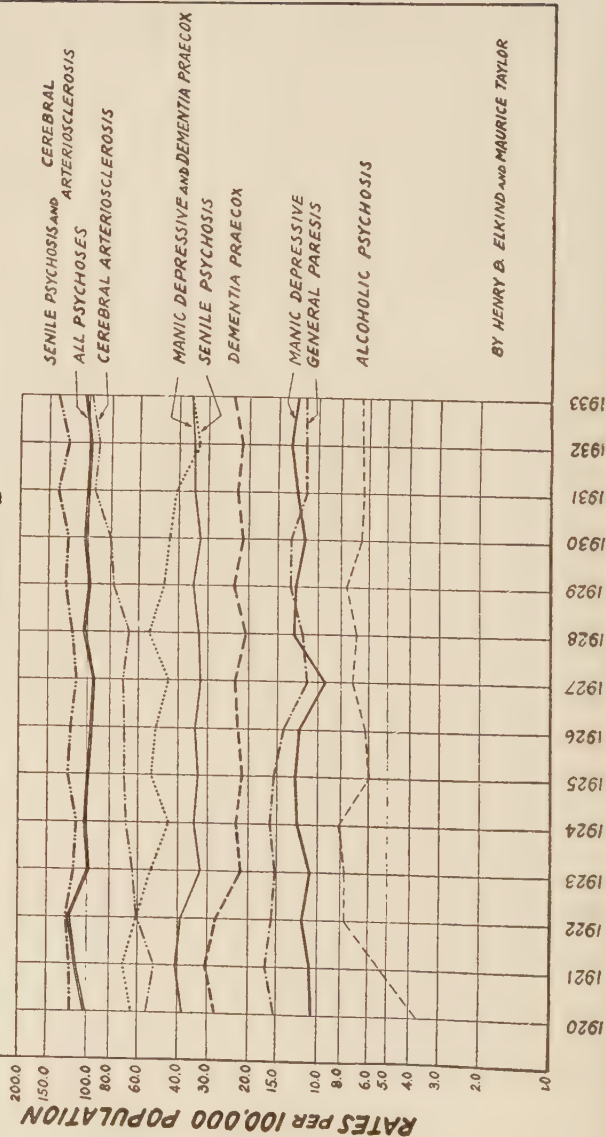


TABLE I.

MASSACHUSETTS.

FIRST ADMISSIONS (COURT COMMITMENTS ONLY) TO MASSACHUSETTS STATE HOSPITALS AND MCLEAN HOSPITAL.

(Rates per 100,000 population (adjusted for age) for the years 1920-1933 incl.)

Year.	Population 15 years +			Population 35 years + (general paresis.	Population 55 years +			Population 15 years + All psychoses.
	Alcoholic psychosis.	Dementia praecox.	Manic depressive.		D. P. and M. D.	Senile psychosis.	Psychosis with cerebral arteriosclerosis.	
1920.....	3.7	27.5	10.6	15.1	38.1	64.0	55.2	102.0
1921.....	5.3	30.7	10.8	16.7	41.5	69.0	50.7	111.0
1922.....	7.6	27.4	11.7	15.7	39.1	61.0	60.7	118.0
1923.....	7.7	21.5	10.9	15.2	32.4	52.0	62.6	98.0
1924.....	8.1	22.5	12.4	16.1	34.9	44.0	67.7	101.0
1925.....	6.0	21.1	12.6	15.4	33.7	52.0	68.5	100.0
1926.....	6.3	22.2	12.1	14.1	34.3	50.0	69.5	97.0
1927.....	7.1	23.0	9.4	11.3	32.4	44.0	69.8	94.0
1928.....	6.9	20.5	12.7	11.8	33.2	53.0	66.6	102.0
1929.....	7.6	23.0	12.6	13.1	35.6	46.0	79.5	99.0
1930.....	6.6	21.0	11.4	13.1	32.5	44.0	80.6	102.0
1931.....	6.3	22.8	12.3	11.3	35.1	41.0	94.1	100.0
1932.....	6.4	21.5	13.2	11.4	34.7	32.5	90.7	98.5
1933.....	6.5	23.6	12.4	11.4	36.0	36.0	97.9	102.0

TABLE I.

NEW YORK.

FIRST ADMISSIONS TO NEW YORK CIVIL HOSPITALS.

(Rates per 100,000 population (adjusted for age), for the years 1917-1934 incl.)

Year.	Population 15 years +				Population 35 years + General paresis.	Population 55 years +			Population 15 years + All psychoses.
	Alcoholic psychosis.	Dementia parox.	Manic depressive.	D. P. and M. D.		Senile psychosis.	Psychosis with cerebral arteriosclerosis.	S. P. and C. A.	
1917.....	8.2	20.3	11.5	31.8	25.4	49.6	33.4	83.0	94.9
1918.....	4.8	25.7	13.3	39.0	25.6	55.7	33.1	87.8	92.7
1919.....	3.6	25.2	13.5	38.7	23.6	58.8	33.5	92.3	91.6
1920.....	1.6	25.6	11.7	37.3	21.1	53.8	42.7	96.5	87.6
1921.....	2.5	26.6	12.8	39.4	20.5	51.8	44.0	95.8	90.2
1922.....	2.9	23.2	13.4	36.6	20.1	54.8	47.2	102.0	88.9
1923.....	3.4	22.4	12.0	34.4	18.7	56.0	46.0	102.0	85.4
1924.....	4.5	23.1	12.1	35.2	18.2	50.0	50.0	100.0	83.8
1925.....	5.0	24.1	12.4	36.6	17.4	54.7	53.3	107.0	87.8
1926.....	4.9	22.5	11.4	33.9	16.9	53.0	61.0	114.0	84.2
1927.....	6.3	24.2	12.0	36.2	16.5	53.0	67.0	120.0	89.5
1928.....	5.6	25.7	13.2	38.9	18.0	60.2	68.0	128.0	95.2
1929.....	5.8	23.4	13.0	36.4	16.3	54.7	73.3	128.0	92.5
1930.....	5.8	25.0	12.2	37.2	17.1	50.3	81.7	132.0	95.8
1931.....	6.2	25.3	12.5	37.8	16.6	46.6	85.4	131.0	96.3
1932.....	6.0	28.1	12.5	40.6	16.0	53.5	101.5	155.0	106.0
1933.....	7.1	28.5	14.1	42.6	17.2	55.8	108.2	164.0	110.0
1934.....	8.7	29.0	12.2	41.2	15.4	58.7	113.0	171.7	111.0

noted that the high rate for New York of 111 in 1934 was attained by Massachusetts in 1921 and exceeded by Massachusetts with a rate of 118 in 1922. These facts suggest that Massachusetts passed the crest in 1922 and has been showing consistently lower rates since, while New York has been reaching this point of community care of mental diseases only during the last two or three years. Massachusetts has been consistently ahead of New York in the number of beds provided by state hospitals. In 1921 New York provided 341 beds per hundred thousand of the population while Massachusetts provided 361. In 1922 the New York rate was 348 and the Massachusetts rate 368. The difference in 1934 is even more marked, New York presenting a rate of 406 and Massachusetts presenting a rate of 455 (civil state hospitals residence cases only).

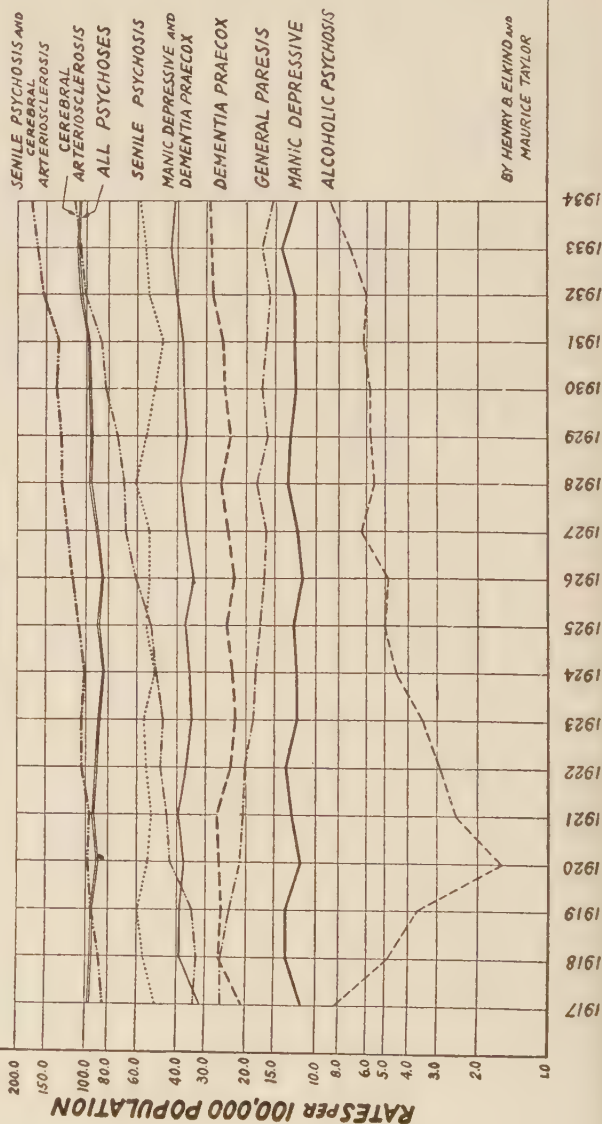
Considering now the specific psychoses: Chart I for Massachusetts shows an increase in the trend for *psychosis with cerebral arteriosclerosis* but a decrease in that for *senile psychosis*. These two psychoses, however, should be considered together because both give considerable difficulty in differential diagnosis. When these two are added together, the trend becomes practically flat (at best, the increase is slight) and one may therefore infer that actually there has been little change in the incidence of the psychoses associated with old age.

The trends for *manic-depressive psychosis* and *dementia præcox* (*schizophrenia*) present practically the same phenomenon, that is, a questionable rise in the rate of incidence of manic-depressive psychosis and a questionable decrease in the rate of incidence of dementia præcox (*schizophrenia*). When these two are added together, which should be done because of the difficulties in differential diagnosis, the trend becomes practically flat. One may therefore infer that these two numerically important functional psychoses show no change in incidence for the period studied.

The trend for *alcoholic psychosis* shows practically no change after 1925 but a rise before that year. No inference, however, is made in the instance of this psychosis because of the disturbance caused by prohibition and repeal, and of the relatively short time-trend.

The trend for *general paresis* shows a slight but definite decrease which seems consistent in the light of our increased knowledge

FIRST ADMISSIONS TO NEW YORK CIVIL HOSPITALS
RATES PER 100,000 POPULATION (ADJUSTED FOR AGE - SEE TABLE II)
- FOR THE YEARS 1917-1934 INCLUSIVE -
- CHART II -



both of etiology and treatment of this disorder, as well as increased community facilities for diagnosis and treatment.

Chart II for New York gives roughly the same trends for the specific psychoses as does that for Massachusetts. There is, however, one important exception. The trends for the psychoses associated with old age when considered together show a distinct rise. (This is due entirely to an increase in the psychoses with cerebral arteriosclerosis; the senile psychoses show no increase.) It may be, of course, that New York with a larger urban population than Massachusetts finds it much more difficult to care for individuals suffering from psychoses associated with old age in their homes.

The *functional psychoses* considered together (manic-depressive and dementia præcox) present a more or less flat trend, as in Massachusetts.

The *alcoholic psychoses* show a definite rise in trend beginning with the year 1920, but slackening off in the later years; before 1920 there is a sharp decrease. But here, as in Massachusetts, the disturbance due to prohibition and repeal and the limited number of years involved seriously limit the validity of any inference in the case of this psychosis. However, it is interesting to observe that both states show agreement in the rise following the year 1925.

New York, like Massachusetts, shows a distinct but more marked decline in the trend for *general paresis*, for probably the same reasons.

In our opinion, there is little or no objective evidence available to justify the belief that the major psychoses have been on the increase during the past 14 to 18 years, except possibly in the instance of *psychosis with cerebral arteriosclerosis*. Whether there has actually been an increase or decrease in any of these psychoses, or no change in their incidence, is also difficult to state because we have no estimate of the number of mentally sick people in the community with these psychoses, especially in their milder forms. At any rate the available objective evidence is against the notion that the major psychoses generally are on the increase.



SYMPOSIUM.

PSYCHIATRIC IMPLICATIONS OF EDUCATION— PRE-SCHOOL.*

By DOUGLAS A. THOM, M. D., BOSTON, MASS.

An organized psychiatric interest in the pre-school child in this country started at about the same time that the nursery school movement actually got under way, that is, between 1919 and 1922 although the formulation for this new educational adventure had been in the process of development for some years before. In 1919 the Bureau of Educational Experiments opened a nursery school in the City and Country School in New York City. The Merrill Palmer School of Home Making opened a school to be used for a laboratory for education in 1919. The Ruggles Street Nursery School started in Boston, January, 1922. The Habit Clinic for Child Guidance in Boston began its operations in the fall of 1921 and the demonstration Clinics, supported and directed through the efforts of the Commonwealth Fund and the National Committee for Mental Hygiene, followed. Other important and permanent centers for child study have since been organized.

Looking over the literature on the subject of nursery school education, one finds the objectives fairly well-defined. One worker states: "The objectives for nursery schools focus on a change in educational attitude toward behavior problems in children. The responsibility of teachers and parents is to maintain an unemotional attitude."¹

"The purpose of the nursery school is the full development of all the powers of a growing human being."²

"The preschool's aim is presented as the educative agency of the child's 'inborn predispositions.'"³

"Everywhere the nursery school has been a spontaneous, constructive enterprise for a better physical, mental, and emotional development of the child than the unordered home can foster. It

*This and the following three papers were read in a symposium, "The Psychiatric Implications of Education," at the ninety-first annual meeting of The American Psychiatric Association, Washington, D. C., May 13-17, 1935.

A closing address by Dr. Vivian T. Thayer which formed part of the symposium is unfortunately not available for inclusion with this series.

has regarded itself as a necessary adjunct to mother care, rather than a substitute for it.”⁴

Patty Smith Hill states that “The nursery school is an outcome of changing society—shortage in houses, limited space, and women in industry, all being factors in this change.”⁵

Dr. George D. Stoddard, one of the pioneers in the nursery school movement, speaking in the same vein states that “Nursery schools and kindergartens are in themselves a definite response to one great change in our social order; namely, a better understanding of the developmental and social needs of young children.”⁶

It would seem, therefore, that the nursery school movement is a response to the appreciation of the fact that some type of organized education should go hand in hand with the mental development of the child and furthermore that education should incorporate into its general plan a recognition of the fact that the habits, personality traits, and mental attitudes which are formulated during the pre-school years are worthy of serious consideration in the total development of the individual. No one can deny that this broader conception of education which has for its objective laying a substantial foundation for future mental and physical health as well as cultivating the soil for the more constructive form of intellectual training, is absolutely sound. That we have at the moment no definite yard stick by which to measure the achievement of the nursery schools does not seem to me to be particularly important. The important aspect of the situation is that during the past two decades a stand has been taken by the educators to so broaden their field—to include a more comprehensive program of the problem of growth and development of the child.

A review of the researches carried out by the nursery schools is not striking or convincing that those directing these schools have taken time to formulate the results of their work in the light of the subsequent life experiences of their graduates, yet had such studies been made, it would be difficult to evaluate just what pre-school education contributed to either the success or failure of the group.

It has been pointed out that “Among the possible physiological effects of nursery school training may be those engendered by more sleep, better feeding habits, better health and even exhilaration caused by new interests, more attention and an understanding

teacher.”⁷ The same authors also pointed out that “A group of orphanage children placed from six to nine months under a nursery school régime showed consistently greater gain in mental test performance than did a carefully paired control group of orphans deprived of such experience.”⁷ While Tayler and Frank found that “Although children who had previously attended nursery school or kindergarten tested higher upon entrance to first grade than did children who had not had this benefit of such previous schooling, the increased intelligence apparently produced by nursery school and kindergarten training was not maintained after subsequent schooling.”⁸ Katherine B. Greene, Associate Professor of Education, University of Michigan, was impressed by the fact that “Nursery school children in kindergarten reacted more positively than did the children direct from homes because of independence and social balance learned in nursery school. Maladjustment came from trying to teach these children what they already knew and thus boring them.”⁹

Dr. Eliot and her associates make the following observations:

Attendance at a pre-school group may help, in several ways, the child who has some special physical need.

In the personality of the individual child, which includes the sum total of his capacities and attitudes, the life of the pre-school group may have direct constructive influence.

1. It establishes routine habits—the regular regime of the school, the presence of other children who carry out the routine as a matter of course, the less emotional attitude of the teacher, each has a strong influence.

2. It builds up habits of self assistance—encourages the child to do for himself in so far as he is ready.

3. Creates ability to adjust to other person—both the aggressive and the timid child profit by group play.

Among common behavior problems where attendance at pre-school has been of significant constructive help are problems arising from extreme introversion and extroversion.

Personal success in the pre-school is achieved by adjustment to the group, whereas in the home the child's success frequently is attained by domination over certain adults.

Methods in Individual Adjustment.

1. Emphasize success either in accomplishment, or in self control, physical or emotional.

2. Definite guiding of the factors of the situation in order that the child may attain success.

3. Creating opportunities for the exercise of those aspects of behavior which need especial emphasis in development.
4. Changing unfavorable grouping among children by some regrouping.
5. Providing an orderly environment free from confusion, over-interference, over-suggestion.
6. Encouraging freedom of choice.
7. Quiet insistence upon fulfillment of a necessary condition before passing to a new interest.
8. Allowing the child to meet many situations suitable to his experience and maturity.
9. Ignoring that behavior of the child which is chiefly an attempt to gain attention.
10. Providing opportunities for the working out of individual purposes and interests.
11. Helping the child to feel that the best is expected of him and that his presence is welcomed by the group.

Mental Hygiene problems of the pre-school age are not particularly different than those of any other age group. Two general types of behavior problems.

1. Those in which failure in development or in social adaption are dependent upon distinct types of mental disorders.
2. Those types of behavior which in one way or another disturb the person with whom the child lives to the extent that they recognize the child as a problem.

Preventative Work (associated with pre-school education) :

"1. Parental training—make parents conscious of the emotional bonds that exist between them and their children and some of the defects in their own emotional reactions toward their children.

"2. Adequate provision for meeting the child's developing intelligence, emotions, and physique.

- a. Proper kind and adequate amount of recreation.
- b. Contact with adults and children other than those in the family.
- c. Surveillance of the child's activities so that they do not become dangerous to himself or disturbing to others.
- d. Recognition of the point that play is the child's work and that through the doing of things, whether these be abstract or concrete, but particularly through the development of the large muscle masses, the best kind of training is provided.

Nursery schools have developed various forms of recreation and useful activity.

Many things have contributed to an increasing need for extra-home facilities, of which the nursery school is one.

1. The smaller size of the modern home.
2. Grouping together in smaller areas of larger and larger masses of people.

3. Assumption outside the home of the major tasks of producing and distributing the things which are needed to maintain the individual physically.
4. The going out of mothers to work.
5. Increasing emphasis on money as a medium of exchange.
6. Isolation of the family from its own larger family group."

It is of interest to all and is of special concern to the mental hygienist that "40 per cent of the nursery schools in the country reporting to the White House Conference gave as their first objective 'To aid emotional adjustment of children.' Twenty-four per cent—'Education of the parents' as their first or second objective, appreciating the need for training the whole child." ¹¹

Effort has been fruitless to obtain from the leaders in the nursery school movement concrete evidence of the effect of pre-school education on the subsequent development of the child's personality. Such information in the form that it could be utilized apparently does not exist. The very nature of the work obviously makes reliable statistical data, desirable as it may be, well nigh impossible to obtain. Dr. John E. Anderson, Director of the Institute of Child Welfare, in a personal communication, writes "Very little follow-up work has been done on nursery school instruction. There are tremendous difficulties in the evaluation of any educational program and particularly in one which lacks the specific content found in school subjects at a higher level and which can be measured." *

Considerable time has been used to point out the *purpose*, objectives, techniques and the difficulties in evaluating pre-school education at the moment. This step appeared necessary if we, as psychiatrists, are to determine just what the psychiatric implications are in this ever-growing movement and if we have anything to contribute which might add to its worthwhileness.

As psychiatrists, we are interested in any type of educational or social activity that holds forth promise of helping children acquire, in the process of their growth and development, those fundamental habits, personality traits, and mental attitudes toward life which

*From the Child Development Institute Teachers College, Dr. Lois Hayden Meek, Director; The Iowa Child Welfare Research Station, State University of Iowa, Dr. George Stoddard; and Merrill-Palmer School, Detroit, Michigan, Edna L. White, Director, one receives a similar response to any plea for definite statements relating to follow-up studies of the nature the mental hygienist would desire.

will give them greater assurance of avoiding the stresses and strains created by personalities and environmental situations with which so many young people come in conflict; yet if mental hygiene is to occupy a truly important place in preventive medicine, it must take on something of a more positive nature than simply helping the individual to steer clear of rather obvious shoals and getting wrecked.

A mental hygiene program which does no more than reconstruct conduct patterns after they have become twisted and warped and recondition undesirable habits after they have taken root is not really fulfilling its obligations in the field of prevention. Rather should we be thinking in terms of how best to create an environment and so educate parents that during the child's early years when so many fundamental attitudes toward life are in the process of development that he may escape those situations and experiences that create unhealthy emotional responses toward parental relationships, dependency, authority, inferiority, and various other ego-centric drives. We should be concerned with what is taking place in other realms of the child's mental life such as his imagination, volition, perception. All these important aspects of his mental life are lying dormant awaiting the stimulation from some environmental source. Under certain undesirable conditions and unhappy personal relationships, important emotional outlets may be obstructed which should be serving a most useful purpose in ways that would help to stabilize the individual. No claim is made that consideration of the factors mentioned would prevent psychotic disasters, but there appears to me to be an important relationship with this positive approach to mental hygiene and such problems as delinquency and the neurosis.

Dean William L. Machmer of Massachusetts State College pointed out at a recent meeting, the necessity "without neglecting the three R's in their very broadest sense, for giving our young people a real opportunity to develop the three I's. These are:

"Independence—the courage to be different

"Initiative—the capacity to be different

"Imagination—the joy of being different."¹²

The mental hygienist is not particularly interested in the fact that intelligence quotients are temporarily raised. He is vastly more

concerned over the possibilities held out by pre-school education that the child will be subjected to and guided by adults whose perspective is sufficiently broad to allow each and every child to enjoy his individual differences and at the same time develop an attitude of tolerance and the habits tending toward conformity. We, as mental hygienists and psychiatrists, are not unmindful of the fact that sound bodily health and a high intelligence quotient are not in themselves incompatible with inefficiency and unhappiness nor do we fail to appreciate that many problems are determined by a low social and economic level rather than by complexes and conflicts. Our task is to take the individual material as we find it and see that it is not exposed to insurmountable handicaps of a material nature or to the long-continued stresses created by emotionally driven adults.

Furthermore, we are no longer satisfied with simply removing the pitfalls. We want to have an environment well-endowed with personalities, disciplines and techniques which will be a challenge to the child to meet and combat successfully in a life full of reality situations regardless of the stage through which he may be passing. No period in life, however, can possibly take on the same significance or importance as the pre-school years. Fundamental attitudes toward life are conditioned largely by the experiences of these years.

If the objectives as outlined by the leaders in the pre-school movement can be achieved to any appreciable degree and if this type of education and training can be efficiently rendered to any large portion of the pre-school population of this country, I am convinced that its psychiatric implications are important, especially to that large group of under-privileged children; not necessarily under-privileged in the sense of their economic status, but under-privileged by virtue of the fact that they have been denied the opportunity of spending those early years in an environment uncontaminated by adult personalities whose outlook on life has been warped by their own unhappy experiences.

There are certain inalienable rights to which every child is entitled.

1. The opportunity of acquiring those habits which are essential to bodily health—eating, sleeping, eliminating, exercise.

2. The opportunity of developing his inherent intellectual equipment (whatever it may be) to its highest degree of efficiency.

3. The opportunity of being reared in an environment which is not dominated by emotionally unstable and mentally inadequate adults (whether they be parents, nurses, or teachers).

4. The opportunity of developing his self-regarding sentiment to a point where he will enjoy a sense of security about life, the feeling of being wanted and the desire to be worthy of the confidence bestowed upon him.

5. The opportunity to develop his initiative, imagination, will power, and independence.

6. The opportunity of learning to feel, think, and act in the presence of the facts of any given situation so that he can make the choice that is best suited to the demands of that particular situation rather than the choice that appears to be convenient for the moment.

CONCLUSION.

If a generation of children were permitted to enjoy during the pre-school years, an environment which fulfilled their physical, intellectual, and emotional needs as outlined and as expressed in the proposed plan for pre-school education, there is reason to believe that they well might attain a greater sense of security in all personal relationships resulting in a harmonious adjustment with parents, contemporaries, and those in authority. They would acquire confidence in self as a result of personal achievement, and adequate recognition, and something very much worth while and far-reaching would be accomplished. Such a group would find a happier and more efficient adjustment to the demands of life and relatively less conflict with society in general.

Dr. James Plant recently made the statement that "There seems to be evidence that maladjustment and delinquency are as rampant as ever and that we have no certain technique for their prevention and control."¹³ No one who faces the problem frankly will be in disagreement with Dr. Plant though it may be looked upon as a rather sad commentary on the contribution which psychiatry proposed to make to the solution of these important social problems.

It occurs to me that pre-school education has already embodied into its curriculum many of the fundamental principles of mental

hygiene and this has been done in relation to the child in such a way and at such a time that this broader concept of education stands in a unique position to serve well the needs of a vast army of pre-school children. I know of no other institution with the possible exception of the home that has a more important contribution to make.

The psychiatric implications can only be understood and appreciated when we take into consideration the importance of the pre-school years in terms of establishing a foundation for mental health keeping in mind that mental health is something more than being free from mental disease. Mental health in its broadest sense represents a state of mind that permits the individual to approach his maximum efficiency, attain the greatest amount of happiness and satisfaction out of life and do these things with a minimum amount of friction. Life is one continuous series of choices and adjustments. Conflict and friction over making these adjustments invariably leads to varying degrees of emotional instability. Pre-school education stands in a position to make a real contribution to both parents and children. Psychiatry will do well to cooperate and encourage the pre-school movement not only contributing what it can toward its further development, but to be receptive to the opportunities which this new venture in education may add to the field of mental hygiene.

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PSYCHIATRIC ASPECT OF EDUCATION— GRADE PERIOD.

By FREDERICK H. ALLEN, M. D., PHILADELPHIA, PA.

The grade period representing the age span of six to thirteen is the first period of self-realization in a social setting outside the protected confines of the home. In this period he passes from the more individualistic phases of the earlier years and finds himself in a new world making demands upon him to use his own capacities for his own growth and education, and directing through curricula, and discipline the manner of their use.

Education essentially is a positive aspect of growth. Broadly speaking, it is growth. But here we are concerned with the more specialized aspects of education incorporated in school frameworks. Education, being a positive process, implies not only change, but an acceptance of change by the individual and the increasing use of his own energies to bring it about, as he relates himself to the external requirements for change—the teacher, group, etc. The facts and attitudes making up the content of each educational setting selectively become a part of the child's own development as he accepts the need to use his own capacities and also the direction of this use provided by the school.

The educational experience for a child in grade school requires a setting with form, content and direction. Into this organized setting comes the child who, in the process of his growth, finds this experience one that society has created for him as a part of the moulding influence which his culture exerts upon him; and which, in varying degrees, he finds he desires.

The child brings into each new educational setting, the capacities and feelings organized and experienced as a part of himself in the preceding years. In the earlier and less formalized domain of the home, he acquires his first sense of himself as an individual, different and separate from others. Here began the first acceptance of growth as a phenomenon which happens to him through an increasing use of his own energies. The nursery school and the kindergarten provided the first organized opportunity to use

and develop these early strengths in a new setting—apart from the home which gave him the first start toward his own separate existence. These settings provide the first supplement to the less formalized education of the child in the home setting.

Our culture organizes these growth steps and keeps them under some control. Compared to the early growth curve of children in more elemental cultures, the rate is slowed down by such control—and responsibilities are put on them more gradually. This also means that development is more organized and the child, as growth proceeds, finds more and more frameworks outside himself which mould responses. The natural and spontaneous nature of individual growth becomes disciplined by these frameworks. This means that growth is always an adaptation of the more individual responses to the requirements of his social setting. How he does this—with his own emerging capacities—and how the frameworks set up to direct it can be made social assets and not hindrances, both to the community and to the individual are the common interests of both educator and psychiatrist.

The psychiatrist has an interest in the nature of the frameworks, but his major concern is with the individual, who in the educational setting finds a place to organize and develop and test out his own creative capacities. Naturally, this interest includes a concern as to whether the framework accelerates or hinders this process and joins with the educator in evaluating how educational procedures are effected in stimulating positive efforts from the widely different types of individuals who come to them.

Many children do run into snags at this period when society, through a teacher and an organized group, is attempting to direct the intellectual and emotional growth of the child. Some of these snags are created by the child through experiencing here some of the feelings which get started in earlier periods of his life. Some are created by unsound and inelastic procedures of the school. But, if these later influences come to light as difficulties, they do so because of the responses stimulated in the child.

My particular part of the symposium concerns the child in the grades. Here many problems peculiar to this period of development are encountered. The requirements of school are beginning to demand more independent thinking from the child, there is more competition in the group life, creating more awareness of individual

differences. It is a period when there is more testing out of certain authorities. They are confronted with certain attitudes emerging from the group such as, to be enthusiastic about school is not quite the accepted thing. They are in a more active growing period physically—are becoming more restive under the restrictions of classroom life. They are more aware of the wide differences in adult opinions which create a more skeptical attitude toward learning. They begin to ask "what practical use is this." In other words, there is less submissiveness to educational contents and to formal requirements and a greater sensitiveness to their individual rights and interests.

These are rather natural reactions found in all human beings against the directive forces which operate upon them from the earliest days of life on through to death. Rebellion may have very healthy implication as well as serve as an indicator of difficulty. These assertions place the most interesting task before the child and the adult responsible for his direction. The child has the job of both assertion and acceptance. His freedom to be assertive, in the sense that he is asserting his own difference, does have an important bearing on his freedom to accept and appreciate difference in others.

Equally important is the philosophy of the teacher who is the immediate representative of this cultural force. She has to relate herself to children with wide differences and has the need to create some common ground upon which these differences may be expressed and yet keep in the foreground of her directive efforts the primary goal, the acceptance on the part of the child of his own difference and of utilizing his capacity responsibly in a social setting.

Where individual differences are accepted as the fundamental factor in all groups, then opportunities are afforded to use these differences creatively to provide a common background. But as rigidity increases with the goal of uniformity coming into the foreground, individual differences are minimized and not utilized. Rigidity brings out and gives a fertile field for intensifying the more negative responses. This does not mean, however, that absence of form and withdrawal of direction would mean the stimulation of creative effort. Every child needs authority and direction.

The concept of freedom to be himself in the earlier period if psychologically unsound because differentiation has not developed in the child to the point where he has any clear conception of what is his own self. So instead of freedom, there may be confusion and fear and a sense of isolation. Direction tempered by respect for individuality of the person seems a biological necessity.

In the grades, the child is getting his first organized opportunity to find what he can do as an individual, both with and against others. Here he finds how he can relate himself to others, meet the requirements of a school situation and do many things he would have no desire to do, except as they are required—develop his friendships in the group—restrict his own natural tendencies, talking, moving about, etc., to allow for group action.

Here the child has the interesting and important problem of preserving his own individuality while yielding to the required aspects of the educational process. The beginnings of this same adjustment start in the earlier relations of the home where, in widely varying degrees, things are required which demand a response on the part of the child—either for or against the thing required. The child brings into the grade situation the accumulated experience up to that time and carries it on.

The grades provide the further testing out ground for the child to determine his degree of freedom to use his own creative capacities in meeting the required and the spontaneous aspects of this experience. Here he has the opportunity to gradually make the required aspects of education (growth) his own and provide more and more of his own stimuli.

Since this period of growth finds the child in the process of determining and using his creative self and doing this under stimuli from without and within, the natural thing to expect is an ambivalent attitude toward teacher, curriculum, routine and other parts of the process. The rather natural response of the average child during this period is both to like and hate school. He accepts and fights it at the same time. Vacation is a period of freedom and the school is a period of restriction and work. A great deal of the content of education is not an expression of a child's spontaneous interest. In a large measure it is provided for him and he takes it as part of the required experience. With varying degrees of

rapidity he makes some of these interests his own. The bringing in of content provides one way in which the culture moulds the children and gives continuity to its ideologies. These are the directive forces to which a child adapts, sometimes with struggle—sometimes with acceptance.

As the directive forces multiply, putting more pressure on the child to fit into a mould, the stronger become the negative forces to ward off this intrusion. Placing too great emphasis on the intellectual aspects of education too early in the grades, before these activities become the individual's, may set in motion so much negative strength that they become resistive to intellectual development in later years, when normally we see these interests becoming a part of the individual's own development and are no longer imposed. The grade period is the important period in determining later attitudes toward learning. Being a period when a great deal of the content of the experience is outside the child's inner range of interests, means the interest must be created through direction and stimulation of natural curiosities. The achievement of this can be and frequently is blocked by too much content, too little imagination on the part of the teacher and too much direction during a period when the child is rather sensitive to the guiding of his rapidly developing personality.

Those trends in modern education which lay less stress on the intellectual aspects and more on the growth and emotional development take cognizance of this important point—and allow a child a better opportunity to grow into his interests and affords a more natural medium for a positive attitude toward learning. School is kept at school and not transferred into the home at night—with homework to provide a battleground between parent and child and a chance for further crystallization of a negative attitude toward learning.

The tendencies in most adult-child relations have been overloaded on the sides of direction and giving. This has been true in educational relationships and to a considerable extent is still true. The adults have the advantage and the tendency to exploit it. They know more than the child regarding the directions in which growth should proceed. They have patterns which they want realized in the child. Patterns of social and individual behavior, patterns of educational interest and so through the life of the growing child.

Their acceptance has many values for both child and school. But it also has another side. It has made possible more direction and more rigidity in frameworks. The natural tendency has been to exploit the child's submission in order that in the latter period of self-realization and self-assertion, the direction stimulated in this more plastic period will be fulfilled by the operation of their own wills. Here giving is motivated, as it frequently is, by the need to control.

I indicated the naturalness of this because through such direction cultures gain continuity and are perpetuated. But the psychiatrist, being interested in the normal unfolding of the individual's creative capacities asks how are we blocking self-direction and postponing its fulfillment by putting too much into this formative grade period, by stressing too heavily the intellectual (or instructional) aspects of growth and education.

These are questions the educator has asked and many of the changes in the educational frameworks are attempts to answer this question. The important principle of more participation on the part of the growing child has been incorporated into more school procedures, allowing for an earlier achievement of wanting school from within and less of the mere acceptance of it as an external requirement, and tolerated because everyone else does it.

SUMMARY.

In summary I want to reemphasize that the grade period, both in school and in home and community, is not only a period of further self discovery for the child, but also a period of self-realization and a chance for the utilization of his own strengths as he begins to determine the nature of his interests and the quality of his responses. School is an instrument devised by our culture to give direction to part of the growth and to provide tools to aid the process of self-realization.

If too much rigidity and direction is provided, both in the content and in the quality of direction, the child may be blocked in the positive unfolding of his own interests and develop those negative attitudes which too commonly interfere with the achievement of the educational goal—self-direction in utilizing and developing own capacities. And if too little direction is provided, the child

who has not achieved any very clear realization of what he is may be left too much to his own direction which can lead to confusion and inaction.

The psychiatrist with his interest in the growth steps of the child and his awareness of how this growth is influenced can make an important contribution to the advancement of educational procedure as it proceeds to perfect its program to provide a healthy medium to direct the learning of the child. I would like to see this contribution come through attention to some of these broader issues rather than in the interfering and more authoritative ways which Mr. Thayer correctly criticizes in his abstract.

Collaboration on a different basis, with mutual recognition of the contributions and limitations of the other, can lead to more application of sound principles of growth to this period of the child's educational life.

PSYCHIATRIC IMPLICATIONS OF THE HIGH SCHOOL.

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Perhaps it is in order, before narrowing the focus to the special features of the high school, to consider some of the broader implications of education generally and of the school as a community agency.

Education is a process of growth in which many professions, all with special objectives, take part—the physician, dentist, teacher, judge, priest, nurse, social worker and recreation worker. It is a process of developing the potentialities of the individual child for meeting life's situations satisfactorily, and this is the common ultimate objective of all of these groups. The goal of psychiatry and of mental hygiene thus may be expressed in the same terms: developing the potentialities of the individual for meeting life's situations satisfactorily. It is evident that the field of education and that of psychiatry ideally conceived have much in common, and that as far as children are concerned, there is no place for conflict between them, except as they depart from this objective. But these identities do not stop with objectives. The two professions are striving for the same objectives *with the same children*, and it is inescapable that identities be found in their methods as well. The psychiatrist speaks of maturity and fixations, the educator, of growth and flexibility; the psychiatrist, of rapport and relationship therapy, the educator, of modern education as centering about the dynamics of pupil-teacher relationships. The psychiatrist and the teacher both sense the part played by their own personal problems in their professional jobs.

Education as a process is not limited to any one professional group, but is an inescapable element in the efforts of all who deal with children. The dynamics of human behavior are either consciously recognized and utilized in inspired education or blindly over-ridden in a short-sighted variety.

The close study of psychiatry and education tends to emphasize their similarities much more than their differences. To see the differences, one must examine the narrower, more proximate objectives. To appreciate the meaning of a school system in its various relationships, one must first of all appreciate the meaning of a community. He must see the community as a set of services established to meet needs that are too complex or expensive for people to provide for themselves.

People are integrated beings; they do not analyze or separate their health, welfare, transportation, work, school and recreational needs to a degree that makes it possible for a community to deal with them as separate problems by isolated, independent agencies. These needs appear in combinations known as life situations that can be served only by functionally correlated agencies that are separate only for the values of division of labor. In this division of labor, the school deals primarily in cultural transmissions of a formal sort; it passes on to the next generation the accumulations of the past that are too broad for the culture of the ordinary family to transmit. The school builds up the more complex aspects of the coming generation. That is the nucleus of its work, but some of these cultural things enter so intimately into the daily living of the child that the school cannot transmit knowledge alone. It is remaking or moulding the child in a much more fundamental way, and in so doing, comes very close to the interests of psychiatry. There is evidence that this moulding process is now becoming the primary rather than the secondary job of the school. These cultural transmissions, the skills learned, are often technically useful for such a short period, due to accelerating changes in our civilization, that the focus of the school seems to be shifting from mere transmission of knowledge and skills to the permanently significant moulding process. What used to be a by-effect now becomes the center of interest, and what used to be the center, *viz.*, teaching facts, retains some of its old values, but becomes, in addition, a temporary instrument for directing and controlling mental growth. If we can think of mental hygiene as graded in complexity, and including: custody, the adaptation to limitations; treatment, the attempt to remove limitations; prevention, the attempt to forestall limitation; and positive action, the attempt to develop assets, we

can see the functional relationship of psychiatry and the school. Their interests center in different parts of this range. Psychiatry and education are complementary disciplines occupying different ranges of the scale and necessarily overlapping to a degree. When we appreciate these two things, first, that the school cannot transmit knowledge alone, and second, that the school alone cannot transmit knowledge, the interdependence of the professions becomes clearer.

This overlap of function demands a degree of mutuality of training, a thing that at present is practically non-existent because the mutuality is not generally appreciated, and because of the jealously guarded departmentalization in our universities. These departments are caissons that provide for each group an atmosphere of its own that it tends to preserve. Much of what we have come to appreciate in this relationship goes back for its inspiration and method to the pioneer work of Ralph P. Truitt, in the La Salle-Peru Township High School, and to its late superintendent, Thomas J. McCormick. With the foregoing consideration of education and schools generally as a background, I shall pass on to some special psychiatric implications of the high school. The above recital does not complete the generalities. I reserve some for further discussion, even if they are not peculiar to the high school. There are many things about the high school that have deep psychiatric significance and that I shall consider in order: Certain changes are taking place in its methods and aims; the high school stands as a nucleus of emotional growth for the adolescent; the life period of the high school pupil has special meaning; the high school curricular and extracurricular subjects are delivered with varying objectives; the teacher as a person is a potent element in the life of the pupil; the social aspects of the high school loom large in the social development of the pupil; the psychiatrist in his work with parents meets conflicts on many of these points, and here and elsewhere through his influence in the community is in a position both to add much to the evolution of the school and to derive much from its experience that his own practice can never duplicate.

Among the changes that have taken place in the high school, most striking is its democratization. In 1880, 2.8 per cent of those of high school age were to be found actually in high school. Today,

over 50 per cent are included. This means that in the past the group was more uniform and was selected for high intelligence, high economic level, and high prospects of college; whereas today there is a wide range of ability and need. This is shown in the variation in I. Q. averages for those taking the different courses now offered by our high schools. When 60 years ago over half of the graduates of high school became college graduates, a curriculum shaped by college requirements was more harmonious with its function than such a curriculum would be today, when about one-seventh are destined to enter college and the greatest number enter clerical work. Over a long period, the high school and industry were reciprocally related; industry absorbed those who failed in school, and failure could be tolerated in the presence of this buffer. As industry began to shed its lower age levels, the school in turn acted as a buffer to it. But in doing so, the school changed its complexion. Failure could be condoned under the old régime which made it less imperative for the school to prognosticate educationally for the pupil. It could escape the limitations in the pupil by shedding him. The failing pupil could drop out and find an earlier vocational adjustment. Now, with a greater diversity of pupils and futures of pupils, mere "passing" standard grade tests cannot be considered a sufficient objective, because it offers no alternative to destructive failure. It has to avoid failure by more accurate prognostication and by discarding custom-made schedules. When one considers the importance in psychiatry of fitting jobs to capacities, the implications for mental health of this movement are obvious, and the extent to which in any particular child the school has kept pace with the movement is a matter about which the psychiatrist should consult the educator and collaborate with him. This is particularly true of the high school where divergencies in pupil capacity and interest loom larger. The homogeneous grouping of pupils, assignment of work individually in keeping with capacity, the provision of broader courses, such as general mathematics instead of concentrated algebra, all tend to encourage the needed flexibility of curriculum. The use of tests has now a long tradition behind it, but psychiatric study as a part of evaluation and prognostication in individual planning by the school is only just beginning and has far to go to define its limits and refine its methods.

Since this movement to reduce failure weakens the value of a standard grade test as a criterion, and reduces its use, it likewise removes or weakens the incentive to achievement, even if artificial, provided by the tests, and demands that the schools put some other incentive in its place. It is highly significant to psychiatry that this newer incentive is a more fundamental one and is found in the opportunity for satisfaction in creativeness that is provided to the pupil; *i. e.*, the expression of individual potentialities, in solving diverse real life situations instead of standard artificial ones. Music and art as they now appear in the curriculum tend much more than before to enhance the appreciation of the artistic compositions of others instead of the doubtfully useful pretense at developing technical facility.

This is in line with the principle that education for life consists not merely in foreseeing and planning for *future* needs, but perhaps even more important, in meeting in the healthiest way possible the contingencies of today. The school is thus a potent influence in the growth of personality to a degree that the psychiatrist cannot ignore. By motivating the pupil through arts, hobbies, life problems, and occupational interests, it enhances self-discovery and provides him with nuclei of higher tensile strength than is found in success in tests, to which to relate the various other experiences of his life, in other words, about which his personality can effect a more coherent integration. But this more positive growth element is not all. The diverse activities of our high schools give him that opportunity for symbolic expression that Dr. John Levy has shown in the case of art in psychiatric practice to have therapeutic value.

Then there are the psychiatric implications inherent in the age group of the high school. Here, in the planning of his courses, the pupil is forced to make decisions about his life work, and to see that not far ahead as a reality lies the end of a period of comfortable and protective dependence. As if that were not enough, he is forced to struggle with the reluctance of his parents to part with him, and with their tendency to try to continue to shape his career in keeping with their own interests. Otherwise, if he does not struggle he capitulates and forfeits his freedom and self-respect. Here is the age of highest expectancy of mental disease, the tenth

grade, where today two in every classroom of about 40 are prospective mental hospital patients. Here is the one place where professional observation is sufficiently continuous and informed to capture the prodromata of dementia præcox. Attitudes toward reality, emancipation of thought and action, feelings of inferiority, and religious conflicts all come to expression and crisis. The accumulation of records of high quality makes it not unlikely that the key to the schizophrenic evolution of the personality may be provided by the teacher well oriented in mental hygiene. The slumps of this period often present a nice problem of differentiating mental disease and defect. Even apart from these more dire problems, the high school once developed to its full capacity presents the best source for study of the genesis of personality in this second decade.

The school varies greatly in the extent to which the subjects provided in the curriculum are tuned to the functional motive. Written composition, for example, is overly preoccupied with the mechanism of expression and pays little attention to developing the need "to have something to say." On the other hand, oral composition is often delivered with the expressed objective "to help pupils meet with intelligence and ease life situations demanding speech." The dynamics of human relationships in actual or stylized life settings as revealed in literature, the drama, and movie are recognized as of value in shaping the pupil's personality through providing vicarious experience for him. It is expressive of this value that mental hygiene interest in secondary schools most frequently appears first in teachers of English.

These mental hygiene potentialities of school subjects are all too infrequently recognized, with the result that sometimes attempts are made to teach mental hygiene or its so called principles in a didactic fashion that often does more harm than good. The subject of home economics is full of possibilities for revealing to the pupil important elements of the family drama, the values of play, and the essence of child care and development in a more objective way.

It is not only the classroom that provides such an opportunity. The compensatory value of athletics and the escape value of ill-health give the sensitive teacher an appreciation of adolescent struggles

long before they impress the family and are carried to the doctor. The extracurricular activities reproduce the social problems of life more than do those of the classroom and by the same token provide a potent instrument for shaping the developing personality. The elements of competition and exhibition as a part of contests have important psychiatric implications, both etiological and diagnostic.

The school organization itself raises some questions that interest the psychiatrist. Outstanding is the differential in maturation of the sexes. Our chronological grouping in a co-educational setting throws together in the first year of high school a group of girls who have become women and a group of boys who have not yet become men. Teachers are sometimes puzzled by the relative aggressiveness of girls at this period. What co-education does in fixing patterns of interest and influencing heterosexual growth in the eighth, ninth and tenth grades is worthy of psychiatric study.

Since the school is focusing more and more on the things that *happen* to children in the course of education rather than *subject* matter, it is unavoidable that it should begin to consider more seriously the element of personal relationship between pupil and teacher, and the mental health of its teachers. It is of interest that schools are taking more interest in the living conditions of teachers, and in their relationship with their principles and other superiors.

It is very easy for the teacher to slip into the parental rôle when, on the one hand, her yearnings carry her in that direction, and, on the other, the child is seeking at the same time to escape and retain parental domination, and is susceptible to a compromise in the person of the teacher. She has a weighty responsibility in guiding this dependence to a happy conclusion, neither shying in the beginning, nor holding fast too long. With understanding, she can see the fickleness, crushes, trying attitudes and behavior, and rebellion of the pupil as the awkwardness of a growth process, neither bruising with unnecessary self-defense, nor upsetting the progress of growth through the injection of her own problems. What she is as a person makes a world of difference. It is often within her power, as a more wholesome substitute, to step in and interrupt the transmission from parent to child of neurotic patterns. It is to be expected that teachers will only slowly reach that stage of objectivity when they will accept supervision and training for this relationship,

involving as it does their own personal lives, problems and personalities. As a matter of fact, it is rare to find the personality of the teacher given formal consideration in practices of selecting teachers for positions. It is significant of this attitude that a teacher probably will go more readily to a neurologist or psychoanalyst than to a general psychiatrist for her personal problems, and it falls to the psychiatrist who has the most to offer her on this score to study the reasons for her attitude and ways of meeting it. The advances in both fields are thus tending to draw them into common interests, and each is in a strategic position to help or embarrass the other.

With the democratization of the high school and the enrichment of curricular and extracurricular activities, there is a shift of the social life of the adolescent, and hence the social growth of the adolescent, from neighborhood to school. This is immensely important to the whole process of emancipation. It effects a more complete separation, but, at the same time, widens the gap and increases the possibilities of conflict. This is difficult enough where the gap represents merely the difference of two generations of the same culture, but is more serious as between the first and second generation of immigrant groups whose differences already are too broad for many to span. The consciousness and control by the school of this social element contains, however, potentialities for detecting interferences, and easing the jump so that it may be made less destructive. What is true of national differences is true to a degree of all cultural differences that neighborhoods tend to preserve and that uniform education tends to level. While the teacher is guiding growth in a way that makes this jump easier, the physician dealing with the parents is in a position to effect a similar change in them, and to coordinate his efforts with those of the school.

Psychiatry is the branch of medicine that has most in common with the work of the school. In the problems brought on by the congregation of pupils, the teaching method, the curricular content, the educational receptivity of the pupil, and the coordination of the school with the rest of the community, he has an interest that is validated again and again in the case studies of his patients. The school is constantly involved. There is probably no one outside the system who can do as much to win public support for a mentally

hygienic type of schooling as he, and there is no field that can appreciate more the preventive values potentially residing in the school.

It is clear that many of these advanced qualities attributed to schools are found only here and there, just as this is true of the ideals of psychiatry, but by centering attention on the forefronts, we are forced to see that the two groups have the chance to pursue many interests in common.

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THE PLACE AND POSSIBILITIES OF THE MENTAL HYGIENE APPROACH ON THE COLLEGE LEVEL.

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In 1930, a full-time psychiatric or mental hygiene unit was established at the University of Michigan, an institution with an average enrollment since that time of 11,684 students. This unit is now completing its fifth year of active functioning. Through this experience, naturally, a certain practical perspective has been afforded as to the nature of the problem implicit to college mental hygiene service and the limitations and possibilities of such endeavor. In view of the importance of this approach and its still mooted status respecting appropriate and authentic scope and form, it was felt that a critical epitome of this specific experience might possibly be of some worth to others engaged, or interested, in this field.

First naturally, in this connection, the question of set-up, still more or less an open one, presents itself for consideration. Rather differently than some, our organization from its inception, for reasons both of principle and financial expediency, was developed about the constructive use of competent psychiatric social workers. Experience seems eminently to have justified this formula.

To begin with, the staff consisted of one full-time and one part-time (six hours per week) psychiatrist, and two extremely well trained and experienced psychiatric social workers, competent also in clinical psychology, one a man and the other a woman. In addition, a secretary or office manager was provided and since then two half-time junior women workers, coming originally for further training, were taken on.

With respect to articulation point within the university structure, it should be stated, the department is organized as an integral part of the Student Health Service. This, also, experience has confirmed, at least on the basis of the locally obtaining conditions and circumstances, as a logical and effective arrangement. For

one thing, for a new venture, autonomous inclusion within a cognate and already well established and accepted organization constitutes, in itself, a by no means inconsiderable practical aid. It enables also what is really vital, a small, quiet and gradual beginning, and affords from the outset an excellent and dependable source of clinical material. In addition, an important consideration, the identification of the work is thus preserved with the body of medicine as a whole. This point, naturally, brings up the question of designation which has been a much discussed one. The unit is known as the Mental Hygiene Department. Likewise it is known to be under psychiatric direction. This we feel to represent the most constructive practical position. On this basis, there has been no lack of clientele, in fact, decidedly the opposite, with the total steadily increasing. Also it is the honest and factual position and, incidentally, serves a valuable educative function respecting the scope and implications of psychiatry as such.

Further, relative to Health Service connection, the immediate availability of ample and modern medical facilities, including opportunity for bed care (often an imperative need), at the unit's actual base of operations, is a matter of great practical moment. Such an arrangement, likewise, through the close contact afforded with the general Health Service personnel, does much to enable a properly consultative and integrated process of case-handling, so important to really adequate medical functioning. Of course, assuming other conditions, other placement formulæ might prove more appropriate and effective. Moreover, it is quite conceivable that time and development, intrinsic and extrinsic, may lead naturally, in this case, to certain modifications of the original situation.

Discussion, at this juncture, of the general mechanism of procedure, finally crystallized through experiential test as most expedient and effective, may be of interest. Each fall, in connection with the general physical examinations held during orientation week, all entering students are briefly seen so that arrangement for attention may be made where there is indication of special or immediate need. Short as this contact is, a really very helpful impression is afforded relative to the new group as a whole. In this connection, code notation is made on each student's examination card designed to indicate something, considering all aspects, as to

adjustment status and possible vulnerability respecting the university experience. Such notation has been found in a practical way to be quite valid and helpful as part of the medical docket, throughout the individual's university career. At this time, besides, certain special questions come up, such as admissibility to the university and the advisability of return for certain individuals because of difficulties arising in previous years.

The routine proper begins with the commencement of class exercises the following week, and proceeds from that point, on a crowded, full-time clinical basis to the end of the year. Cases come from various sources, as will be noted. They are seen, as far as possible, at stated appointment times arranged for by the secretary. Such appointments usually take an hour or more at the beginning. Subsequent appointments often may be somewhat less time-consuming, the total number of contacts depending, of course, upon the needs of the situation and the time available. The relationship to the student is a confidential, physician-patient one. This is the only formula that appears effective. Even in disciplinary cases most seems accomplishable through voluntary contact, with the understanding that an absolutely fair report directed to the most constructive solution will be made to the official agency concerned.

In the absence of special circumstances, students are first seen by the psychiatric social worker, the men being assigned to the man worker and the women to the women workers. By the worker, the situation is established and actually treatment or corrective measures, especially in simpler cases, begun. Following, the student is seen by one of the psychiatrists and then carried on by him with the aid of the worker, or in the absence of especially significant or major pathology, returned to the worker for handling. Such follow-up, of course, is conducted under the close direction of the psychiatrist, throughout the continuity of the contact. This mode of procedure has turned out extremely well. Although by no means a new finding, it has been surprising how effectively lay workers may function in this relation and how much responsibility they may come satisfactorily to assume, particularly after a period of close cooperative contact with the medical or psychiatric personnel.

Admittedly, from a strictly theoretical or absolutist point of view, the work may be somewhat limited as to elaborateness of clinical

approach and extensiveness of intra-psycho exploration. However, experience indicates need for a certain caution relative to the degree and abruptness of such intra-psycho penetration and upturning. It has been found best to approach first the practical handling of the immediate difficulty and from this to move to the undertaking of as much of the complete personality situation as circumstances and time allow, being careful to avoid having acutely on hand, at any time, more problem element than can be satisfactorily dealt with. In other words, with the central idea of promoting a maximal degree of self-insight and mobilization to an understood and unfearful life reality, the best working formula seems to be to proceed gradually and unforcedly, to the extent and at the rate set by the individual situation. Very important, in this respect, is it that the relationship with us is an entirely voluntary one and that whatever is attempted must be on the basis of readiness and willingness. As it turns out, this progressive or distributive type of approach subserves very nicely the matter of rapport. Frequently, in this way, where resistance is noticeable or sensed at first, the individual is often found to return later in a state responsive to indicated corrective endeavor.

Furthermore, the majority of the problems encountered, as will be seen, are not of an order where the practical indications require any very elaborate or extensive clinical investiture. Of course where such happens to be the case, that need as far as possible is supplied. Albeit, where the situation is markedly of such a nature it is often very questionable, in any event, whether continuance at school would in a clinical or practical sense, be considered desirable or constructive. In this relation, the principle followed is to retain in residence and aid in every way possible those for whom there is expectancy, with reasonable effort, of adaptation of such type and degree as to justify the continuance of the university experience. On the other hand, the mental hygienist should realize that he is functioning in a university, not a sanitarium; and that it is just as important a service to contribute to the discouraging of inadequate, incompatible or defective material as it is to encourage that which is positive.

Fundamentally, most of the situations are problems of social case-work with a psychiatric slant or facet. In short, they are sociopersonal adjustment problems. That is, a certain thing or

combination of things has happened to a certain adolescent or post-adolescent individual, of a certain make-up and vulnerability, and has resulted in a distressed impasse. This being so, whatever is to be done must be done in terms of the total situation. This manifestly, cannot be achieved through a series of detached, clinically professional, in camera discussions. Thus, as well as the patient, instructors must be seen, administrators consulted, and a variety of matters and aspects discussed with various other persons, as friends, parents and physicians. Jobs must be secured, financial aid arranged, programs lightened, living arrangements modified, social outlets afforded and so on. Parenthetically, it may here be stated that every effort is made to cooperate to the highest degree with other welfare units, and to avoid duplication of effort.

Out of all this, if anything meaningful is to follow, an adequate plan must be made taking fully into consideration the facts of the objective context as well as the personality structure and dynamicism of the individual patient. Furthermore, direct and practical help must be given the individual to carry out this plan as a well rounded whole, as well as specific effort directed to more effective personal integration *per se*. Obviously, this latter is absolutely imperative. However, practical experience demonstrates that technical psychotherapeutic procedure of itself is not sufficient for this purpose, and that it must proceed *pari passu* with the adequate management of the situation in its entirety. The problem is not, in the strict or more limited meaning of the term, one merely of individual integration, assuming the tenability of such a conception. Actually it is an attempt to integrate the individual in terms of a specific and demanding extrinsic field of force, the college situation. In other words, the building or adaptation is not of an *in vitro* type but must be, if possible, into and as part of this insistent and problem-bringing envelopment or setting. This being the case, the importance of the adequately trained psychiatric social worker for this type of work becomes readily apparent. And actually, for smaller institutions, such a formula would seem an effective one, provided opportunity were available for special psychiatric consultation as needed.

Further to facilitate envisagement of the nature of the work and its practical possibilities, a brief factual summary of our experience is herewith presented.

In the four completed years of its functioning, the unit has seen and given attention to 2301 students, 1521 men and 780 women, or 1.95 men to 1 woman. This is somewhat below the ratio of men to women in the student body as a whole, which was 2.6 to 1 during the period in question. The age range was from 14 years to 58 years, with a median of 20.05 years and a mean of 22.06 years. Of this number, it might be added 6.3 per cent were married and 0.4 per cent divorced.

Representation as respects the various colleges is shown in Table I. This follows quite well the distribution of the total student

TABLE I.

REPRESENTATION FROM VARIOUS COLLEGES OF THE UNIVERSITY.

	Per cent.
Literature, Science and the Arts.....	50.04
Graduate	16.20
Engineering	14.90
Law	3.80
Education	3.27
Medical	2.70
Architecture	2.50
Music	2.40
Dental	0.83
Business Administration	0.50
Others (Pharmacy, Public Health, Library Science, etc.)..	2.50

population, save that on the whole the quota is rather higher, for our series, from the college of Literature, Science and the Arts, than from the professional and graduate schools.

Respecting university status when first seen, this may be gathered from Table II.

TABLE II.

UNIVERSITY STATUS WHEN FIRST SEEN.

	Per cent.
Freshman	26.8
Sophomore	17.4
Junior	19.4
Senior	16.2
Graduate	16.3
Special	3.6

Relative to the above, it is significant that all levels were represented fairly evenly save, as might be expected, for a distinctly higher number from the freshman group.

Students came or were referred in the following ways (Table III).

TABLE III.
SOURCES OF REFER.

	Per cent.
Health Service Staff.....	69.57
Self	17.60
Various other sources (administrators, instructors, student advisors, dormitory heads, friends, parents, etc.).....	12.86

In this connection, it is of interest that, including re-opened cases, the number of the self-referred type increased from 24 per cent in 1930-31 to 44 per cent in 1933-34.

As to general health status on entrance, 24.3 per cent were given doubtful or unsatisfactory ratings.* This would seem somewhat higher, as might perhaps be anticipated, than occurs for class groups as a whole. Thus, on averaging the classes of 1936, 7, 8, those to which the at present employed rating formula was applied, the doubtful or vulnerable percentage is found to be 13.3.

With regard to academic aptitude, if any inference may be drawn from the fraction (34.4 per cent) taking the regular scholastic aptitude tests given by the university, our group fol-

* The following is the rating schema officially utilized by the University Health Service. Ratings below B are taken as vulnerable or unsatisfactory:

Rating A—These are free from recognized physical or functional defects which may be reasonably expected to interfere with university work or later life successes.

Rating B—These have such recognized defectiveness as *may* hinder university work or later life successes. Early extensions or development into serious conditions are not anticipated.

Rating C—These are the same as B, except that the hindrance is judged to be *very probable*.

Rating D—These should be in the university only upon the condition that they be carefully watched.

Rating E—These should not be in the university.

690 not included, chiefly because originally rated on a different basis than the above.

lowed quite well the general distribution with, if anything, a certain weighting upon the higher two quartiles.

Of some interest, too, is it that 45.31 per cent * impressed us as vulnerable or questionable, at the time of the fall examinations, from the standpoint of personality adequacy with respect to ease or capacity for effective adaptation to the university situation. The average figure, in this connection, for all entering students was 27 per cent.

As concerns number of contacts required, the average was 8.4 with the student, and 9.9 about the student with other persons involved. This latter type of interview is often just as time-consuming as the former and, in view of preceding discussion, obviously just as important.

Respecting duration of contact, the following was observed (Table IV).

TABLE IV.
NUMBER OF YEARS AS A CONTACT.

	Per cent.
One	80.85
Two	13.12
Three	4.53
Four	1.48

From this it would seem, other things being equal, that for student situations extremely long contact-continuity is not in most instances necessary.

Diagnostic findings are summarized in Table V.

The above is significant in that the number of situations characterized by pathology of major proportions is quite small. Nevertheless, this group is an extremely important one respecting which, for the benefit of the individual and the university, proper attention and disposition must be promptly forthcoming. Also important is the very large number of simple reactionary and maladjustive situations of pathologically minor type, very encouraging therefore therapeutically, but where at the same time considerable distress and disability had in numerous instances occurred. In

* Ratings available for 1249, the balance not having been seen during the fall examinations, or having entered at other times.

many such situations of course, in the absence of adequate remedial procedure, there is a certain potentiality of even permanent handicap.

It is noteworthy, too, that 24.9 per cent of the cases were definitely acute and of more or less urgent type, necessitating intensive attention immediately and not enabling handling through appointment later on when the docket might conveniently permit. Bearing on this point, it should be emphasized that as it orients itself practically, the work is far from an "arm-chair," placidly philosophical

TABLE V.
DIAGNOSTIC FINDINGS.

	Cases.	
Schizophrenia	23	
Paranoid States (undifferentiated)	8	
Manic-Depressive Psychoses	19	
Taboparesis	1	
Toxic States	10	
Total Psychotic Situations	61	Per cent. 2.6
Epilepsy	25	1.0
Miscellaneous organic central nervous system conditions and special defects (including cerebral arteriosclerosis, post-traumatic states, epidemic encephalitis, speech defects, tics)	46	1.84
Simple Reactionary Depressions	242	10.5
Psychoneuroses and Psychoneurotic Reactions	883	38.3
Psychopathic Personality	56	2.4
Problems of general personality adjustment, not significantly clinical in nature	988	42.9

discussive procedure, with a certain and protected schedule and definite business-day hours. On the contrary, it takes the form unavoidably of a very active, clinical service including both ambulant and bed-patients, and replete with emergency demands occurring at all times, within and without the limits of the business day and week. It is a service, further, rendering imperative a high degree of flexibility and tact and, at times, taxing ingenuity to the utmost. Moreover, the responsibility entailed is a really very considerable one in the light of the implicit human and professional obligation to the best interests and rights of all concerned, patients, university and families, far flung over the country.

In short, the work comes to be a kind of combination *in loco parentis*, psychiatric and social guidance relationship. This to a large group of highly selected, not too stably integrated adolescents, circulating on their own in a complicated social situation, disturbed by personal problems and capable of mercurial reaction possibilities. Such a relation to 856* individuals per year, it can readily be seen might well prove quite a problem to any small mental hygiene group, to meet which the usual training in psychiatry is far from adequate. Furthermore, and very importantly, only limited means of control and supervision are possible and contact must be through trust and not coercion.

Worthy of remark, likewise, is it that there were 197 (8.9 per cent) cases where the question of suicide was frankly present. Here it is of significance that suicide occurred in only two cases, both situations where contact was incomplete. In another instance, first contact occurred only after attempt and too late for emergency medical measures to be effective. The total number of suicides for the entire student body, as far as we have been able to determine, was six for the four-year period. The suicide question is without doubt a very real one and not to be trifled with. Still, for the student group at any rate, it does appear that where proper attention is promptly afforded the suicidal thrust may be in most cases satisfactorily resolved and in especially disturbed states, more particularly the psychotic, diverted or estopped until some adequate more permanent arrangement for care can be effected.

Factors, both subjective and objective, felt to have been of immediate or precipitating influence in the various difficulties encountered have been tabulated as follows.† (Table VI-A.) Admittedly such a tabulation is in some measure open to criticism as superficial, arbitrary and overlapping. Nevertheless in a practical way it is illuminating as to etiologic dynamics and as to elements, personal and social, showing themselves as most likely to give rise to problems in a student group. Of course in this connection it is important that in no instance was there just one item concerned.

* Total for the year 1933-1934.

† 486 cases not included because available data not felt to be adequate. Also, the effects of actual psychotic disorder, clinically specific psychoneurotic mechanisms and organic neuropathology as such were not included as factors.

TABLE VI-A.
PRIMARY FACTORS.

	Per cent of cases where noted.
1. Pronounced tendency to excitability and tensional response.	52.9
2. Worry over school work.	39.6
3. Actual physical disturbance and residual states.	31.4
4. Instability and over-impulsiveness.	31.1
5. Poor orientation to university as part of life situation.	27.0
6. Over-sensitivity.	26.5
7. Immaturity.	22.2
8. Fatigue.	20.1
9. Poor dependability, lack of regularization, poor self-discipline. .	17.7
10. Worry regarding possibility of disease.	15.2
11. Poor scholastic achievement.	15.1
12. Marked feelings of inferiority.	14.5
13. Poor physical hygiene, including over use of tobacco and alcohol. .	13.5
14. General problems of sex adjustment.	12.5
15. Stress of transition to university environment from relatively simpler type.	12.0
16. Inadequacy, over-dependency, and over-suggestibility.	11.5
17. Marked introvert or schizoid tendency.	10.4
18. Poor methods of study.	9.5
19. Financial difficulties.	8.6
20. Poor socialization.	7.9
21. Worry over examinations.	7.8
22. Vocational anxieties.	7.7
23. Worry relative to physical condition.	7.4
24. Egocentricity, tendency to negative defense reactions.	6.8
25. Over-timidity.	6.6
26. Love affairs.	5.7
27. Fear as to future.	5.1
28. Pressure of outside work.	5.0
29. Special disturbing family influences (as illness, conflict between family members, etc.)	4.8
30. Inadequate recreational outlets.	4.5
31. Relatively inferior intelligence.	4.3
32. Academic overload.	3.8
33. Conflicts with family.	3.0
34. Poor general family background.	2.7
35. Poor home training.	2.7
36. Marital problems.	2.6
37. Homesickness.	2.6
38. Special shocks.	1.8
39. Specific misconduct, including disciplinary situations.	1.3
40. Fraternity and sorority problems.	0.8
41. Pressure of extracurricular activity.	0.8
42. Unfavorable heredity.	0.7

TABLE VI-B.
SECONDARY FACTORS.

	Per cent of cases where noted.
1. Immaturity	48.5
2. Over-sensitivity	41.2
3. Instability and over-impulsiveness.....	37.0
4. Marked feelings of inferiority.....	36.6
5. Poor socialization	27.5
6. Poor orientation to university as part of life situation.....	25.2
7. Inadequacy, over-dependency, and over-suggestibility.....	23.6
8. Poor general family background.....	23.6
9. Inadequate recreational outlets.....	20.6
10. Poor physical hygiene, including over use of tobacco and alcohol.	20.3
11. Worry over school work.....	19.5
12. Pronounced tendency to excitability and tensional response.....	19.3
13. Vocational anxieties	16.0
14. Financial difficulties	15.5
15. General problem of sex adjustment.....	15.1
16. Poor dependability, lack of regularization, poor self-discipline..	14.8
17. Fear as to future.....	14.6
18. Egocentricity	14.2
19. Over-timidity	14.0
20. Special disturbing family influences (as illness, conflict between family members, etc.).....	12.1
21. Marked introvert or schizoid tendency.....	12.0
22. Poor methods of study.....	11.8
23. Poor home training.....	11.8
24. Unfavorable heredity	10.7
25. Pressure of outside work.....	9.6
26. Fatigue	9.4
27. Actual physical disturbance and residual states.....	8.6
28. Stress of transition to university environment from relatively simpler type	7.4
29. Conflicts with family.....	6.5
30. Love affairs	6.1
31. Poor scholastic achievement.....	5.2
32. Academic overload	3.4
33. Homesickness	3.2
34. Worry regarding possibility of disease.....	2.8
35. Fraternity and sorority problems.....	2.6
36. Worry relative to physical condition.....	2.5
37. Pressure of extracurricular activities.....	2.2
38. Marital problems	1.9
39. Relatively inferior intelligence.....	1.8
40. Worry over examinations.....	1.5
41. Special shocks	1.3
42. Specific misconduct, including disciplinary situations.....	0.3

Actually, as might be anticipated from appreciation of life situations generally, the problems were multifactoral. Often there were a half dozen or more primary factors with ten or more of secondary weight. With reference to factors of secondary or mediate valence, findings are listed in Table VI-B.

The results of treatment clinically may be brought out as follows: In 18 per cent, the situations were not of a type permitting or requiring any actual régime of therapy as such. That is, they involved, rather, matters of specific advice and decision such as opinion as to mental status, admissibility to the university or advisability of continuing, and points of administrative bearing. Also here included, were numerous specific personal questions, such as—"I am engaged to be married and my youngest sister has just developed epilepsy. What should I do?" In many of this category, although treatment in a formal sense was not carried out, very decided relief was enabled and situations of acute tension resolved.

In an additional 14.7 per cent the contact was incomplete. Here included were those who had to leave school for various reasons including the psychiatric, cases referred too near the end of the session to make full contact possible, and cases where cooperation actively or passively, was not satisfactory. The remainder, 66.7 per cent, was carried on for full therapeutic procedure.* In 87.1 per cent of this group, very conservatively estimated, the result was extremely gratifying. That is, there was noted marked improvement or, clinically speaking, seeming correction of the specific presenting difficulty. In 12.2 per cent some betterment was observed and in 0.7 per cent there was no apparent benefit. The high degree of positive response obtained is of course exceedingly gratifying. However, it is undoubtedly in a large measure explain-

* Relative to "treatment" cases, the following was found with respect to duration of contact:

	Per cent.
Contact continued for one year	76.10
Contact continued for two years	16.25
Contact continued for three years	5.74
Contact continued for four years	1.89

These findings follow very closely those obtaining for the total series (Table IV). However, for the "treatment" group, there was noted a slightly smaller percentage of single year contacts.

able by the highly selected nature of the material, the age zone and, most importantly, the absence in most cases of clinically really serious or malignant psychopathology.

In the light of the clinical results, the academic findings are interesting and the scholastic averages for our series, at the end of the semester when last seen, were as follows (Table VII).

TABLE VII.
SCHOLASTIC AVERAGES.

	Per cent.
A to B (A, A —, B +).....	25.4
B to C (B, B —, C +).....	51.0
C and below.....	23.2

In this connection, it may be added, 238 students were at some time on probation or "warning."

Similarly of interest from the standpoint of results, is the question of special distinction achieved, both academically and extra-academically. In this relation, of 745 students officially so distinguished there were recorded 207 elections to honor scholastic societies, scholarships, etc. On the extracurricular side, including such categories as athletic teams, class offices, committees, campus honorary groups, special professional societies, etc., there were 978 instances of outstanding recognition. In addition, there were 575 who had been admitted to membership in the various fraternities and sororities.

As to actual terminations or outcomes in terms of university status, these at the end of our four-year survey period, as far as could be determined, were as follows (Table VIII).

From the foregoing, it seems plain that in spite of limited facilities and an approach still rather tentative, it has been possible to be of considerable help to many of the student body. Actually, last year, this number represented 8 per cent of the entire student population and, frankly, I believe the surface has only been scratched.

Epitomizing this personal service, first, in this total there were not a few situations too severe or complicated to warrant continuance of student status. These were expeditely, humanly and professionally cleared, to the very real service of all concerned, the

individuals themselves, their families and the university. Then for many others, without formal therapeutic regimen, helpful counsel was possible respecting specific, often very disturbing, questions. And for the majority, actual processes of therapy were carried through with really gratifying results, not only with respect to the alleviation of the specific presenting difficulties but with

TABLE VIII.

OUTCOME.*

1. 781. Graduated.
2. 656. Continuing in attendance at the university.
3. 520. Not at present in attendance, but no actual contra-indication to same on basis of university requirements.
The chief reasons assignable for these known voluntary discontinuances are as follows:
 - a. 103. Scholastic situation not encouraging or actually unsatisfactory, though within official limits.
 - b. 37. Financial.
 - c. 47. Health (1 psychiatric).
 - d. 31. Transfer to other colleges.
 - e. 41. Miscellaneous personal reasons, such as family exigencies, marriage, special employment opportunities, etc.
 - f. 261. No specific reason ascertainable.
4. 344. Not able to continue in attendance, for the following reasons:
 - a. 229. Dismissed for scholastic reasons.
 - b. 19. Dismissed for disciplinary or other administrative reasons.
 - c. 85. Officially discontinued because of health reasons (26, somatic; 59, psychiatric).
 - d. 11. Deceased.

* Of interest here is Bassett's comment to the effect that, in general, the college course may be expected to be completed by 41.35 per cent of entering freshmen—*Mental Hygiene in the Community*, Macmillan, 1934, p. 234.

reference to greater adequacy relative to the more fundamental issues of university and life adaptation. Many even, during their university careers, achieved noteworthy distinction both academically and extra-academically. In this relationship,* through the known existence of a friendly, human, understanding and confidential contact-point available throughout the college period, and

* Balance of paragraph is in main quoted from a previous article by the author—*The Compass Needle*. 1935, I, no. 7, p. 4.

after, much more was accomplished it is felt than the simple proffering of advice or the mere professional handling of this or that perplexing situation or personal crisis. Actually, for many, not a little was achieved in the direction of true, and for the future really far-reaching, character training and development.

That is, if our experience has any significance, there is a very real job to be done and very real need. Furthermore, it is a job fitting naturally into the physician's basic tradition, work with individuals.

Certain other values, too, seem to be implicit to the proper functioning of a college mental hygiene service. Thus through work with individual cases, other campus agencies may be very materially aided in dealing with certain of their problems. Also, through their participation in the handling of such joint situations, a fuller appreciation of the psychobiology of motivation and conduct is made possible, leading to broader, more human and more valid formulæ for dealing with student problems, including the disciplinary. Furthermore, the realization that there is at hand a friendly, cooperative unit glad to help with, and take the responsibility for, certain special aspects, is a welcome and reassuring one; and releases such agencies more completely for the specific functions they may have in charge, whether it be the direction of a dormitory or the academic disposition of students.

Likewise, less directly, as a by-product of work with discrete student problems, there is added a certain quota to the contribution from all sources, relative to a greater grasp of the nature and meaning and implications of the human aspect of the student. That is, the mental hygiene function may supply its moiety to the fuller comprehension of the fact that the student is a human being at school and not a single item of a statistical mass, in the process of a mechanical incorporation of information. This realization, naturally, that a college is a community of personalities assembled for a common human objective, not merely a complicated mechanism, must be achieved if the educational effort is to return its greatest functional yield.

All these, in order of their directness or tangibility, are services which a university mental hygiene unit may aspire to perform and in line with these, lie the place and the possibilities of such departments.

Stated somewhat otherwise, it does seem to me the start should not be with fanfare and advertisement and take the form of any set, pretentious, official program to be applied from above. It should not be this sort of thing, eager to give those operating the university the magic word, pontifically, and to inject into the student body the supreme and final elixir. Frankly, we know not the former and have not the latter—no one has. That is, anything smacking of an imposed program is invalid, even destructive. Nothing is so apt to give rise to resentment and fatal lack of rapport. A certain original skepticism and reluctance to participate is always to be found, naturally, but such need not constitute a real or permanent obstruction. Furthermore, the overcoming of this should not be the primary objective, but rather the best handling of particular presenting student problems. If this is done well, the other cannot help but follow. In this connection, it must be realized that by training and experience the psychiatrist is primarily a physician, a worker with individuals, not an administrator of masses and movements, at any rate in fields not part of his medical branch, which education in a specific sense certainly is not.

On the contrary, the approach should be from below, from the simple specific problem case—the panicky freshman, if you will. From this, if the worker is adequate and sufficiently trained, benefit to the case may result and other cases may follow. Through this process, if there is any virtue in it and the worker, something perhaps may issue of value to the theory and practise of higher education. To my mind, the mental hygienist's primary rôle, and it is a real one, is to serve the individual in his special way to the best of his ability and through that the milieu to which he functions. That is, it is not his place, for example, to tell Professor Brown how to teach. Rather it is to be of what assistance he can, from his own category of competence, in aiding Professor Brown to as comprehensive as possible an understanding of John Smith, who is having difficulty in his course. In this way a constructive solution may be furthered for John Smith and, if there are enough John Smiths, a valid particle may eventually be contributed to the pedagogic principle. That is, the key in procedure would seem to be the highest degree of limitation-cognizant cooperation. Real solutions, here as elsewhere in human relations, may be reached only through mutual inter-acting growth, all along the line.

Furthermore, considering time limits and the size of most mental hygiene staffs there is hardly opportunity for much effective activity beyond the clinical function described, if that is to be properly administered. Here there is the very real danger of spreading effort too thinly, with the usual results. In fact, our own volume has become distinctly too high for adequate performance. Actually a case load of about 500 cases per year for a staff such as ours would seem the upper limit compatible with really effective results for all concerned; or for one full-time psychiatrist and one lay worker, 200 cases.

To be sure, much more might have been accomplished than our experience discloses and many mistakes undoubtedly have been made. Thus even respecting the individual cases, considerably more might have been done. Matters might have been gone into much more fully and there might have been attempted more thorough-going reconstruction, with closer direction and supervision. Also, for certain cases, too much time and attention may have been given. All this, however, is a matter of growth, experience and experiment and, as such, constitutes the essential challenge of the work.

Much more, also, could have been done in the way of the maintenance of contacts other than with student patients, thus promoting both direct and indirect effects and influences as mentioned. As staff increases are secured, this aspect may be more adequately attended to.

In this connection, too, mention might be made of function through lecture, singly or in series or courses. In the way of general orientation, this approach would seem from our experience to have a certain though perhaps somewhat limited usefulness. Mental hygiene is essentially a personal problem and as such is best undertaken on an individual basis. However, courses dealing with the content of mental hygiene and social psychiatry, as an aspect of the body of knowledge and as part of the general curricular structure, are of value and should be made available.

To summarize, there appears to be a very real place for mental hygiene on the college level and very broad possibilities still untapped, and even unrealized. These possibilities lie in the direction of a greater understanding of the personality elements involved, both the teaching and the taught and, through this, the attainment of a fuller and richer mobilization of available means to validly

realized needs. And the straightest way to all this, at this time, humble and undramatic as it may seem, to my mind lies in the most intensive, sincere, and meaningful application of all that the mental hygienist is, in self and training, to the specific problems of the individual student.

Grateful acknowledgment is made herewith to co-workers for unstinted aid and counsel, without which this report would not have been possible.

DISCUSSION.

DR. EDGAR VAN NORMAN EMERY (New Haven, Conn.).—We have had an unusually rich body of information and of concepts passed in front of us this afternoon.

Dr. Thom tended to emphasize the particular types of personality make-up, the individual and reality; Dr. Allen, the individual, his positive desires to learn and his resistances against learning; Dr. Stevenson, the potentialities of the individual for meeting life situations; Dr. Raphael emphasized his experience with 2300 individual students, and Dr. Thayer stressed the need for the closest possible collaboration between psychiatry and education. Personally I have worked for a good many years in the direction of the ideals that have been formulated. However, I do feel that there is another point of view that should be emphasized when a topic of this sort is under discussion. I think we get a certain perspective on this problem of interprofessional collaboration if we stop for a moment to catch a picture of what these two professional groups symbolize in our culture.

Education, except that type which is represented by Dr. Thayer and the progressive group, stands for the most part as an instrument set up within the culture for imposing upon children the cultural pattern, in other words, teaching children what they should know. Just to bring home what I mean, this morning we heard of a plan set up to provide for certification of psychiatrists. That is done by a cultural group, and the younger men coming along and the institutions in which they are going to get their experience must pay attention to this very real cultural pressure. Wherever you find education, except in its most liberal forms, you find this sort of pressure.

In contrast with education, psychiatry is a branch of a healing art—psychiatry meaning a soul healing, if you follow the derivation of the word. One has to do with education, the other with reëducation; the first has to do with the individual case-work methods, the second with the group processes. One has to do with treating those who are helpless in the face of their illness and hence need succor; while education, as we ordinarily see it, has to do with a "should" psychology and the imposing of the cultural pattern upon a group. We find individual teachers, here and there, shifting from this "should" psychology to an attitude that might be described as one of com-

passion and tolerance and understanding. This therapeutic attitude contrasts sharply with the attitude of the person who is teaching the child what he "should" know. In addition, when dealing with reading disabilities or when dealing with children presenting difficulties in social or emotional adjustment, these teachers tend to take on not a group method but a method that implies a special therapeutic relationship to a special child. Now this is the point at which psychiatry has a very real contribution to make to education.

However, psychiatry had best be wary against hazarding guesses as to what methods may be useful for group education. For instance, the other day I was quite astonished to hear a person from a very fine preparatory school in New York comment on their experiences with children coming from progressive schools, the aim of which, as I have understood it, has been to bring about within the child the potentiality for self-direction and self-determination and to do this in as pleasant and painless a manner as is possible. This person stated that in their experience children coming from these schools do not show the same initiative as the average run of children. They do extremely well if meticulous detail is given to them as to plan. Now I don't know whether this is true, whether it is a prejudiced observation or not. I use this simply as an illustration of the fact that educators should be very skeptical of group pedagogical methods that are based on experience derived from the study of individual atypical children. I am not at all sure that we can reason from our experiences as psychiatrists in dealing with individual children and set up programs for group pedagogy. To do so may bring more problems than it solves.

This whole problem of interprofessional collaboration is tremendously important. I think that eventually we shall achieve the ideals that Dr. Thayer and the other speakers have indicated, but perhaps we shall do it better and more intelligently when we realize that there are real difficulties that need to be realistically taken into consideration as psychiatry and education attempt to join hands whole-heartedly in the pursuit of these ideals.

DR. R. GRANT BARRY (Trenton, N. J.).—I think the reading of these papers is very timely indeed. The individual problems are numerous, particularly as to how the school man and the psychiatrist shall get together. I found in my short experience that a good many teachers, notably the principals, had some mental hygiene point of view, especially as regards the family as a whole. However, their chief shortcoming seemed to be with the shy, seclusive, asocial child who did not make any trouble in school. The child who was a problem they seized upon at once. But this particular one they left out of their reckoning.

I think that the psychiatrist should draw the teacher's attention to these children, because, after all, they are the cases which become or are potential præcoxes. In this connection the cultivation of artistic abilities is excellent procedure. They have gone so far with these projects in many schools as to have the children paint the scenery and get up the lines for their dramatic

courses. The intercurricular or extracurricular activities, should be more emphasized, particularly between the classes.

In the examination of new teachers I particularly centered part of the examination at least on what means of diversion they had, their hobbies and so forth; and they were surprised when they were asked about these things. Quite a few had very few means of diversion, particularly relating to their life outside of the school. I think the colleges are doing much more in this respect, particularly regarding interclass activities, than they are in the schools and really are accomplishing a great deal.

DR. FREDERICK L. PATRY (Albany, N. Y.).—I enjoyed the presentation from the different aspects that take one almost from the cradle until education stops, which is at the River Styx. I am particularly grateful to Dr. Thayer who gave us the point of view of the "emotional wholeness" of the child. To my way of thinking, we shall come back to the Mexican ideal of the uniqueness of the individual in terms of his appreciation of emotional satisfactions in the light of self-regard; and also how the intellect can in its turn contribute to that well-rounded emotional living that is effectively socialized.

Dr. Thayer mentioned several types of psychiatrists in the school system. Working in a state education department with principals and teachers throughout the state, I have also come across many types of commissioners, superintendents, principals and teachers. Although I could classify them, I don't think it would be helpful at this point to do so. But I do wish to give the impression that they are very cordial and open to the psychiatrist who serves them with the attitude and ability of adding to *their* strength and trying to see the problem through their eyes and that in the light of the schools' traditional onus which they carry and try to constructively modify. The more I see of progressive educators, the more humble I become and the less convinced that I have a great deal to offer them, except in the more intensive individualized understanding of the child as a whole and assisting in his socialization.

I think that the papers presented today certainly show quite clearly the need of a *combined* approach in meeting the problems of pupil adjustments and how we may better share these in the light of our particularized training and experience.

DR. S. ALAN CHALLMAN (Minneapolis, Minn.).—The problem of psychiatry in education has been an interesting one to me in the last few years since I have been working in the Minneapolis public schools. Dr. Thayer's remarks concerning the needed changes in the school curriculum interested me greatly. It is a problem to which those interested in progressive education have given considerable attention. From the point of view of one who is working in a school system where the rank and file of teachers have not as yet adapted themselves to the newer educational trends in spite of the

effort of the administration to promote the change, I can say this problem touches at the root of many behavior disorders in children.

Present curriculum requirements apparently arose in the school while the single goal of a cultural education was uppermost in the minds of educators. Their idea seemed to be that every child should be culturally educated and theoretically should come finally to a university and graduate with his education complete. But, as Dr. Thayer brought out, so few children go through the university now that that is out of the question as a practical goal.

It seems to me that from a mental hygiene standpoint, a great stride will have been made in education when the curriculum takes into consideration what children *are* doing and what adults *will have to do* in the future, and modifies the training that is given in the school (the course of study) so that it will prepare for these activities directly and not expect them to come as a by-product of a culture-seeking program.

THE HEMATOPORPHYRIN TREATMENT OF DEPRESSIVE PSYCHOSES.*

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Although Hausmann¹ as early as 1916 had demonstrated the photodynamic effects of solutions of hematoporphyrin, little practical use was made of his findings for nearly 15 years, when Huhnerfeld gave injections of the substance to animals and found that they became aggressive, overactive and quarrelsome, especially after exposure to strong light. After a series of these experiments, he began to use the drug as a therapeutic agent in the depressive psychoses. Two cases showing marked improvement were reported in August, 1930,² and by April, 1931³ he had collected 13 cases, 10 of which were institutionalized. The response in this series was extremely favorable in that 11 improved markedly and only two remained unaffected. The publication of his results attracted considerable interest and soon investigators in many European countries and in America were trying the new method. From the literature available at the present time it has been possible to collect a detailed report on the treatment of 149 cases, which are summarized in Table 1. Eight investigators from different European countries, and one group from this country report 113 manic depressives with 57 cases recovered or much improved, 20 improved, 10 slightly improved and 26 unaffected; 12 involutional cases of which 4 recovered, 1 was improved, 4 slightly improved and 3 unaffected; 24 miscellaneous cases of which 17 were unaffected and the remainig 7 showed only a slight improvement. It will be noted that while most other investigators do not record the same high percentage of cures reported by Huhnerfeld, yet in many cases there is distinct evidence of improvement in well over half the cases considered by the clinicians as due directly to the use of the therapeutic agent.

* Read at the ninety-first annual meeting of The American Psychiatric Association, Washington, D. C., May 13-17, 1935.

These reports of definite benefits from the use of hematoporphyrin gave rise to the present investigation. Its scope, however, is a little different from most of those previously undertaken. Accepting the evidence already reported, that the drug is of value

TABLE I.
CASES TREATED BY VARIOUS INVESTIGATORS.

Investigator.	Diagnosis.													
	(Pure Depressive) Manic Depressive Depressed.					Involutional Melancholia.					Miscellaneous.			
	No. of cases.	Much imp. rec.	Imp.	Slight imp.	No change.	No. of cases.	Much imp. rec.	Imp.	Slight imp.	No change.	No. of cases.	Much imp. rec.	Imp.	Sl. imp. transient.
Huhnerfeld ³	13	11	..	..	2	..	..	..	..	..	..	..	..	..
Bianchini ⁴	13	5	2	..	6	..	..	..	..	..	..	..	..	..
Kuppers ⁵	7	6	..	..	1	2	..	..	1	1	5	..	..	2 3
Strecher, Palmer and Braceland ⁶	23	5	6	6	6	8	4	1	2	1	6	..	..	1 5
Hartmann and Weissmann ⁷	9	5	..	2	2	..	..	..	..	..	3	..	..	3
Becher ⁸	5	3	2	..	..	..	..	..	..	..	..	..	..	..
*Giehm ⁹	23	10	4	2	7	2	..	..	1	1	3	..	..	3
Vinchon ¹⁰	17	10	5	..	2	..	..	..	..	..	6	..	..	4 2
Vinchon and Bourgeois ¹¹	3	2	1	..	..	..	..	..	..	..	1	..	..	1
Totals.....	113	57	20	10	26	12	4	1	4	3	24	..	..	7 17

* In Giehm's paper total cases are given as 24 but one is not accounted for.

NOTE:—Huhnerfeld³ has recently reported 40 cases (which presumably include the 13 above) with only 5 unimproved, but as the cases are not described in detail they are not included in the above table.

It is somewhat difficult in some cases to fit the diagnoses of the European clinicians into the American classification, but every effort has been made to do this with due regard to the concepts of the original authors.

in milder cases of depression, it was our purpose to select for treatment those cases of long standing which had proved resistant to other methods of therapy, and in which the prognosis seemed to be definitely unfavorable. In this way we hoped to be able to minimize the effect of the tendency to spontaneous recovery which

is always so much of a moot point in evaluating the improvements recorded in these cases; and we hoped, too, that in dealing with severe cases the physicochemical changes would be more profound and more easily measured. In studying the problem two definite objects were kept in mind, first, the clinical response in these difficult cases, and second, the biochemical changes associated with their condition.

In all, 41 cases have been treated, not including repeated series on some in whom a first course of treatment had produced no improvement. In Table II the results of the therapy are recorded at length and in Table III they are summarized according to diagnosis. Of these cases 14 were diagnosed manic-depressive-depressed, and 6 recovered or were much improved, 2 improved, 1 showed a slight improvement and 5 were not affected. There were 11 involutional cases of which 5 improved, 2 showed a slight improvement and 4 were unchanged. Nine schizophrenics were treated, 1 of whom was much improved, 2 improved, 1 temporarily better and 5 not improved. Of the remainder 1 psychoneurotic was considerably improved, while the organic cases and one mixed type of manic-depressive remained stationary.

The terms used in classifying the cases may be defined as follows: *Much improved or recovered* indicates that the case has progressed under treatment and following it so that the patient has either left the hospital, or is ready to do so; *improved*, that the change for the better is not sufficient to justify discharge; *slight or transitory improvement*, that early improvement was not maintained or that the change was very moderate in amount; *not improved*, that no apparent amelioration of the condition was produced. In all cases in which improvement of any degree is recorded, it was felt that the change was due directly to the drug; some cases therefore which subsequently improved and in which the causal relation was not apparent are not included under these headings.

In evaluating these results it should be remembered that several of the cases recorded as unimproved (for example Nos. 11, 14, 26, 31, 35) received only partial courses of treatment, and that in two cases (Nos. 26 and 35) so little of the drug was given that no benefit could reasonably have been expected. In the remainder it might be pointed out that with the exception of a few cases (Nos. 1, 14, 26), the illness was of long standing and the prognosis unfavor-

TABLE II.
CASES TREATED IN THE PRESENT INVESTIGATION.

Case No.	Sex.	Age.	Diagnosis.	Treatment.	Condition.	
1	F	43	Manic Dep. Dep.	Mouth.	Much Improved	Depression of 4 mo. duration. Not agitated. Usual symptoms.
2	F	34	" "	Complete Hypo. Course.	"	Self accusatory, delusions of incurable disease. Apprehensive, agitated. Over a year hospital care before treatment.
3	F	38	" "	Hypo. Course plus Mouth.	"	Depressed, apprehensive. In hospital year before treatment.
4	F	34	" "	(Also Sod. Amytal) Mouth.	"	Confused, depressed, self-accusatory. Restless. Illness of about 4 mo. duration.
5	F	39	" "	Mouth.	"	Overworked, retarded, anxious, apprehensive. Illness 2 mo. before treatment.
6	M	34	" "	Hypo.	"	Depressed 1 yr. ago then manic spell, then present depression, suicidal, retarded.
7	M	44	" "	Hypo.	Improved.	Previous attack. Anxious. In hospital 6 mo. before treatment. Some paranoid ideas developed during course.
8	M	46	" "	Hypo.	"	Very depressed. Suspicious. Ideas of reference. 4 mo. in hospital before treatment.
9	F	57	" "	2 Hypo. Courses—8 mos. apart.	Temporarily Improved.	Depression, followed by manic followed by depression (2 yrs. duration). Temporarily improved, not sustained.
10	F	43	" "	Hypo.	Not Improved.	Depression of 1 yr. standing before treatment. No other treatment of any benefit to date.
11	M	66	" "	Partly completed hypo. course.	"	Second attack of depression in 4 years. 7 mo. before beginning treatment—depressed, agitated.
12	M	46	" "	Hypo.	"	Somatic complaints, seclusive; depressed 2 years. No other treatment effective.

TABLE II—CONTINUED.

Case No.	Sex.	Age.	Diagnosis.	Treatment.	Condition.	
13	F	48	Manic Dep. Dep.	Hypo.	Not Improved.	Three periods of depression in 7 years. Present one of 8 mos. duration before treatment.
14	M	43	" "	Partial only. Hypo.	"	Depressed, mute. retarded 4 mos. before treatment.
15	M	35	Manic Dep. Mixed.	Hypo. plus Mouth.	"	Worried about physical condition and finances one year. Depressed, agitated, suicidal. Two determined attempts since hospitalization. 3 mos. in hospital before treatment.
16	M	57	Invol. Melan.	Hypo.	Improved.	Previous "breakdown" 10 yrs. ago. Present depression 1 yr. duration before treatment. Somatic complaints and ideas of guilt.
17	M	54	" "	Hypo.	"	Depressed, agitated 1 yr. before treatment started.
18	M	50	" "	Hypo. plus Mouth.	"	Worried, exhausted, indecisive a yr. ago. In hospitals practically continuously 7 mos. before treatment. Somatic delusions. Artificial menopause 8 yrs. ago. Constant suicidal threats.
19	M	61	" "	Hypo. plus Mouth.	"	Following severe sepsis 3 yrs. ago nervous, depressed. Suicidal attempt 19 mos. ago. Ideas of guilt. Hospitalized since attempt.
20	F	56	" "	Hypo. plus Mouth.	"	Artificial menopause 10 yrs. ago. Depressed 4 yrs. 2 yrs. under nurse's care and 9 mos. in this hospital before treatment. Speech blocking, indecisive.
21	F	41	" "	Hypo.	Slightly Improved.	Agitated, worried, sleepless, indecisive. Depression of 6 mos. duration before treatment.
22	F	47	" "	Hypo.— Partial.	Slightly Improved.	Depressed, agitated, suicidal. Duration of illness approx. 1 yr.

TABLE II—CONTINUED.

Case No.	Sex.	Age.	Diagnosis.	Treatment.	Condition.	
23	F	67	Invol. Melan.	Hypo. plus Mouth.	Not Improved.	Depressed, retarded practically continuously for 12 yrs. Previous hospitalization for 6 yrs. then home but not well. Present hospitalization 2½ years before treatment.
24	M	53	"	Hypo. plus Mouth.	"	Depressed, indecisive, inactive for 3 yrs. before treatment. Hospitalization 2 yrs.
25	M	54	"	Hypo. sep. 2 courses.	"	Depressed 1 yr. before hospitalization and 1 yr. in hospital before treatment. Given 2 courses. No benefit from either.
26	F	53	"	Hypo. but only very partial course.	"	Depressed, agitated, self-accusatory, removed before treatment fairly started.
27	F	29	Schizophrenia.	Hypo.	Much Improved.	Two yrs. ago bored, unhappy, withdrawn. Explosive emotional outbursts. Depressed, suicidal attempt immediate before treatment.
28	F	38	Paranoid type. Schizophrenia.	Hypo. plus Mouth.	Improved.	Depression and ideas of reference for 1 yr. before treatment. Very unhappy, crying.
29	F	25	Type unspec. Schizophrenia.	Also Sod. Amytal Mouth.	"	Worried, agitated, depressed. Practically mute. About 1 mo. duration, before treatment.
30	F	39	Paranoid type. Schizophrenia.	Hypo.	Transitory. Slight improvement.	Many somatic ideas, and ideas of guilt. Marked depression and agitation. Duration 5 mos. before treatment.
31	M	39	Paranoid type. Schizophrenia.	½ course only—Hypo.	Not Improved.	Extremely agitated and suicidal. Ideas of 4 yrs. duration and hospitalization of about 1 yr.
32	F	47	Paranoid type. Schizophrenia.	Mouth.	"	Depressed crying inactive. Refused food. Duration 6 mos. Hospitalized only about 2 weeks before treatment.

TABLE II—CONCLUDED.

Case No.	Sex.	Age.	Diagnosis.	Treatment.	Condition.	
33	F	31	Simple type. Schizophrenia.	Mouth.	Not Improved.	Five yrs. ago depressive attack lasting 6 mos. Sudden unexpected suicidal attempt 1 mo. before treatment. Numerous nihilistic ideas.
34	M	35	Type unspec. Schizophrenia.	Hypo. plus Mouth.	"	Depressed, disinterested, apprehensive, fearful. Many somatic delusions 4 mos. before treatment.
35	F	39	Hypochondriacal type. Schizophrenia.	Hypo.—very partial course.	"	Two yrs. ago complained of numerous somatic ills. Very bizarre complaints, depressed, weeping. Remained before treatment fairly started.
36	F	44	Psychoneurosis. Anxiety state.	Mouth.	Much Improved. Recovered.	Depressed, suicidal, over marital failure. Syphilophobia. Somatic complaints. Treatment started one week after admission.
37	F	48	Mixed type. Psychoneurosis.	Hypo.	Slightly Improved.	Depressed, agitated, apprehensive. Hypochondriacal complaints.
38	F	53	Psychoneurosis.	Mouth.	Not Improved.	Depressed 2 yrs. Hospitalized at intervals about 1 yr. Somatic complaints. Fatigue, worry.
39	F	54	Presenile.	Mouth.	Improved.	Gradually depressed for 3 yrs. Many somatic complaints.
40	M	58	Presenile.	Mouth.	Not Improved.	Gradual depression over 1 yr. Unable to work 5 mos. before treatment. Inability to concentrate. No interest. Noisy at night.
41	M	51	Simple Dep.	Hypo. 1 week only.	Not Improved.	Originally admitted as alcoholic. As this cleared, intense agitation and depression evident.

able; that in all cases except two (Nos. 4 and 29) all other drug therapy was withdrawn; that no special adjuvant therapy was given in any case; and that in many cases other types of treatment had been tried previously and without success. With these considerations in mind it appears that following the hematoporphyrin therapy, definite improvement and even recovery occurred in a number of cases previously regarded as of unfavorable outlook.

As might be expected the response is more favorable in those diagnosed as manic-depressive than in the other groups, and in the organic cases little was accomplished. The fact, however, that

TABLE III.
SUMMARY OF CASES TREATED IN THE PRESENT INVESTIGATION.

Diagnosis.	No. of cases.	Much improved or recovered.	Improved.	Slight or transitory improvement.	Not improved.
Manic Depressive Depressed	14	6	2	1	5
Manic Depressive Mixed....	1	..	..	..	1
Involitional Melancholia...	11	..	5	2	4
Schizophrenia.....	9	1	2	1	5
Psychoneurosis.....	3	1	..	1	1
Miscellaneous.....	3	..	1	..	2
Total.....	41	8	10	5	18

improvement was noted in three schizophrenics, and in one of the psychoneurotics, suggests that the cardinal indication for the use of hematoporphyrin lies in the presence of symptomatic depression rather than in the minute diagnosis.

The treatment is of two types, depending largely on the apparent severity of the case. In milder cases hematoporphyrin solution * is given by mouth, starting at 10 drops in water three times a day

* The solution used in these cases is supplied by the Nordmark Chemical Company under the trade name "Photodyn." It is said to be produced from horse blood according to the Nencki process and to contain in the oral solution 5 mgm. hematoporphyrin hydrochloride per c.c., and in the hypodermic solution 2 mgm. per c.c.

before meals, increasing by one drop each day until a maximum of 30 drops three times a day is given, then decreasing at the same rate until 10 drops three times a day is again reached, when the treatment is discontinued.

In the more severe cases hematoporphyrin solution is injected intramuscularly. A dose of $\frac{1}{2}$ c. c. is given the first day, the 1 c. c. in two days, followed by eight more doses of 1 c. c. each on alternate days. After a rest period of about a week, the series is repeated, this time starting with 1 c. c. followed by nine doses of 2 c. c. at two-day intervals.

In some of the worst cases both methods were combined, or one followed by the other, as recommended by Huhnerfeld and followed without any material deviation by all other clinicians.

In the cases in which improvement took place, the change was noted very shortly after the institution of treatment. The depressive picture began to change usually within the first few days and, at most, within the first two weeks. In our experience if no favorable signs were observed in this time, the case did not benefit from the further exhibition of the drug, even in considerably increased dosage. This fact was specially brought out in two cases (Nos. 9 and 25) in which two series of treatments were given at an interval of several months, without results in either. Further, although we have been unable to follow the recovered or much improved cases after they left the hospital, we were able to study some of them for a period of several weeks and occasionally for several months after the termination of the medication, and in none of them did a relapse develop. While this observation accords with the opinion of many of the previous investigators it does not coincide with that of Klimke,¹³ who felt that a continuous or repeated series of treatments was required to maintain the patient in a state of well-being.

In view of the warning of the earlier investigators, extreme care was taken at first to protect the cases from powerful, direct sunlight or ultraviolet radiation. Gradually, however, it was discovered that no unfavorable effects appeared in those exposed to the full summer sun and since then a number of cases have been irradiated artificially without any untoward results. It should be mentioned, however, that none of our cases were of the extremely fair complexion so well known to be especially sensitive to

light. It would be an interesting research for the future to study some such cases and to investigate in detail their response and that of others to carefully measured light exposure.

It may be further pointed out that no untoward effects were observed in any case during the treatment. There were no complaints of pain following injections, and no gastric or other somatic complaints from the cases treated by mouth. This is in strict accord with the findings of Hutschenreuter²² that 20 times the maximum oral dose given to humans was tolerated by rats without significant symptoms, and while he also stated that the usual intramuscular dose did produce toxic effects, the difference in weight between the human being and the rat should establish a sufficient margin of safety.

The second object of the present investigation was to discover, if possible, the cause of the improvement in some cases and its failure to occur in others—in other words to find the method of action of hematoporphyrin. The superficial rationale of the treatment is, of course, obvious. As Huhnerfeld first pointed out, it is based on an analogy to the effects produced in animals, where it was observed that hematoporphyrin made ordinary docile animals restive, aggressive and quarrelsome. Since depressed human beings are inactive, sluggish and retarded, it was argued that by treating the symptoms, some improvement in the underlying condition might be achieved.

The purely empirical symptomatic treatment he evolved as a result of this hypothesis proved satisfactory and, as usual, several efforts have been made to find a more fundamental explanation of the effects observed. Huhnerfeld's original explanation, that the photodynamic substance somehow sensitized the whole system (especially the skin) to the effects of light, and that these effects were transmitted to the vegetative centres, causing increased activity, is still that most generally accepted for lack of something more definite.

With a view to investigating further the mode of hematoporphyrin, the cases reviewed in this paper were given a careful physical and physicochemical check-up before and after treatment. For obvious reasons it was not possible to get complete records on all, but in every case an effort was made to get not only a complete mental status, but a general physical survey and a laboratory work-

up including urinalysis, basal metabolism, blood chemistry, sugar tolerance and blood counts.

In Tables IV and V are shown the results in (a) a group showing no improvement, and (b) a group of improved cases. The urinalyses are omitted because they showed nothing of importance, and only a few sugar tolerance curves are inserted because of the lack of space. These curves obtained before treatment were in general similar to those reported by Katzenelbogen and Friedman-Buchman¹⁵ and Strom-Olsen¹⁶ in similar circumstances, but in the cases which improved high and slow falling sugar tolerance curves showed a tendency to a more normal configuration, while the same phenomenon in the unimproved cases either did not occur at all or to a much less degree. In some cases such as No. 12 they were higher after treatment than before it. All the post-treatment results given in the tables and sugar tolerance curves were taken at an interval of about two months after the first series.

Considering first the results recorded in Table IV which show the biochemical responses in a group of cases which did not improve clinically, it will be seen that there was in general a moderate improvement in weight (with the exception of Case 33), though the blood counts showed a decrease in both red and white cells rather than an increase, and this is also borne out in the hemoglobins. There was a very slight tendency for the non-protein nitrogen to increase while the blood sugar and calcium levels fell. The basal metabolism tended to be lower after the treatment than before it. Case 33 only was worse clinically following the medication. The others, while not improved, did not regress.

In the group of recovered or improved cases (Table V) on the other hand the weights showed little change, though in the whole series there was a slight increase, and while the white blood cells tended to decrease, the red cells increased, and the hemoglobins remained constant. The non-protein nitrogen showed a slight decrease, the calciums a more pronounced drop, and the sugars a definite fall. The basal metabolic rates rose moderately.

The cases recorded in detail in these two tables (IV and V) have been selected not because they are unusual in any particular, but because the findings in them are typical of those obtained in the whole group. While it would be presumptuous to attempt to draw any far-reaching conclusion from this comparatively small

TABLE IV.
LABORATORY FINDINGS—UNIMPROVED CASES.

Case No.	Diagnosis.	Age.	Sex.	Weight.		Basal metab.		Blood chemistry.						Blood counts and hemoglobin.					
								N. P. N.		Sugar.		Calcium.		White cells.		Red cells.		Hemoglobin.	
				Before.	After.	Before.	After.	Before.	After.	Before.	After.	Before.	After.	Before.	After.	Before.	After.	Before.	After.
				Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.	Treatment.
				Pounds.	Per cent.	Mg. per 100 c.c.	Mg. per 100 c.c.	Mg. per 100 c.c.	Mg. per 100 c.c.	Thousands per c.mm.	Millions per c.mm.	Grams per 100 c.c.							
9	Manic Dep.	57	F	131	135	-7	+4	29.2	25.5	88.0	94.6	12.9	10.4	7.350	6.950	4.910	4.880	14.9	13.6
12	Manic Dep.	46	M	161	170	0	-5	31.9	30.4	94.6	105.4	9.8	9.8	6.700	5.950	5.932	5.290	15.6	14.1
13	Manic Dep.	48	F	106¾	106	-3	-5	30.9	27.7	110.6	101.6	10.8	10.9	7.300	5.700	4.730	4.520	13.9	13.9
21	Invol. Mel.	41	F	138	140	+12	+12	37.0	31.2	91.9	83.8	10.8	10.5	5.400	6.150	4.880	4.560	15.0	13.3
22	Invol. Mel.	47	F	106	113	+7	-4	25.2	24.8	83.3	91.9	10.9	10.0	8.900	5.500	4.810	4.620	13.2	14.9
23	Invol. Mel.	67	F	152	150	-20	-18	28.7	33.8	75.3	73.1	10.1	11.2	7.900	7.100	4.930	4.560	14.3	13.0
25 ¹	Invol. Mel.	54	M	117	117	-14	-5	27.6	33.1	101.6	88.6	10.5	10.9	6.200	†	5.200	†	14.1	†
25 ²	Invol. Mel.	54	M	119	122	-5	-15	25.7	34.1	89.2	88.6	10.8	10.8	5.050	5.450	5.230	4.860	15.3	13.8
31	Schiz.—Paranoid.	39	M	175	173	+8	+2	28.8	28.7	85.0	91.2	†	11.1	9.250	8.050	5.350	4.740	15.5	15.6
33	Schiz.—Simple.	31	F	143	126	*+2	*-42	30.3	29.4	87.4	75.3	†	9.8	9.700	7.150	5.220	4.600	15.3	14.5
Average.						-2.4	-3.8	29.5	29.9	90.7	89.4	10.8	10.5	7.375	6.444	5.119	4.736	14.7	14.1

* Because of the marked variation in the second reading, these results are not included in the averages.

† Tests not complete in these particulars.

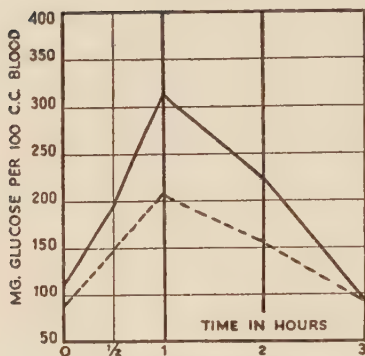
TABLE V.
LABORATORY FINDINGS—RECOVERED AND IMPROVED CASES.

Case No.	Diagnosis.	Condition.	Age.	Sex.	Weight.		Basal metab.		Blood chemistry.						White counts and hemoglobin.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
					Pounds.	Treatment.	Before.	After.	Treatment.	Per cent.	N. P. N.		Sugar.		Calcium.		White cells.		Red cells.		Hemoglobin.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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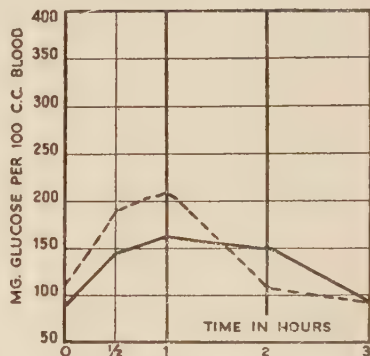
* Patient was uncooperative, so it was impossible to secure a satisfactory metabolism.

SUGAR TOLERANCE CURVES IN CASES WITH HEMATOPORPHYRIN.

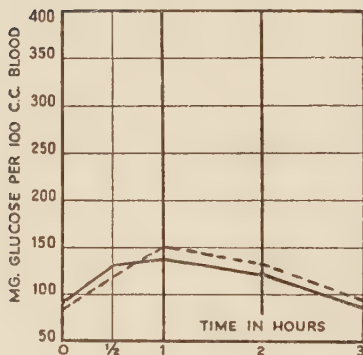
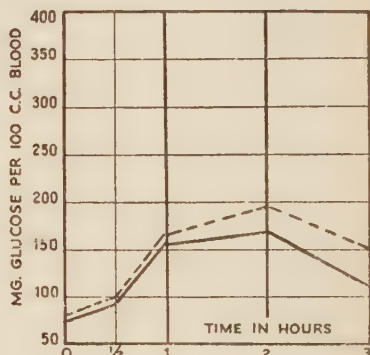
A. CASES CLINICALLY UNIMPROVED.



1. Case 12, Manic Depressive.



2. Case 13, Manic Depressive.

3. Case 25², Involutional Melancholia.

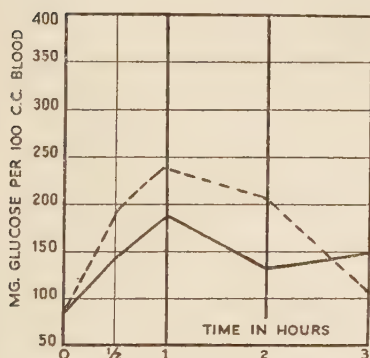
4. Case 23, Involutional Melancholia.

In all the above --- represents curve before treatment and — curve after treatment. The various types of curve obtained are illustrated. In Cases 23 and 13 a high curve fell without clinical improvement, in Case 12 the curve after treatment is much more abnormal than that before, and in Case 25² both curves both before and after treatment were practically normal though a slight decrease in height is noted in the second curve.

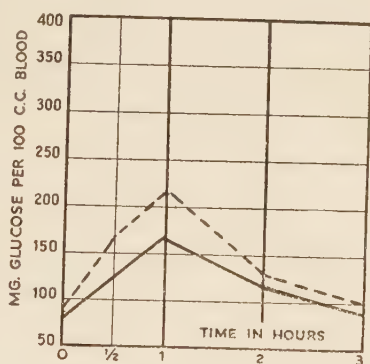
number of cases, the presence of certain trends seems sufficiently definite to warrant further investigation and discussion.

Loss of weight is a textbook characteristic common to most forms of depression. While especially true of the involutional and manic-depressive cases, it is also common in schizophrenia, and not infrequent in agitated depression of organic origin and in the anxiety type of psychoneurosis. Our group of patients, however, having been under observation for a considerable period of time, had attained a fairly stable weight (with the one exception noted, one other schizophrenic and one organic case), and while this was

B. CASES RECOVERED OR MUCH IMPROVED.



5. Case 3, Manic Depressive.



6. Case 6, Manic Depressive.

As before the broken lines represent the curve before treatment and the solid lines the curve after it.

In both cases the high curves fell to a much more normal type. The rise in the 3-hour sugar in Case 3 is unexplained and is not a common occurrence.

usually much below that noted at the beginning of their psychosis, it was not continuing to fall at the time treatment was begun. The fact that no marked gain in weight did occur in the improved cases might be considered as evidence that the improvement noted was not deep-rooted, and yet the clinical benefits were unmistakable and several of these patients returned to their former occupations. If we omit the one case (No. 33) which was obviously rapidly becoming worse, and the other two specially mentioned above, it was apparent that most of the clinically unimproved cases did gain physically (the whole group gained 37 pounds during the period of study), a fact brought out especially by Strecker, Palmer and Braceland.⁶

The basal metabolism of depressed cases has been shown by Walker ¹⁷ to lie within normal limits (± 10), as did most of ours. In schizophrenics he found a distinct fall which was especially apparent in our Case 33. Following the use of hematoporphyrin there was a tendency for the cases which improved to show higher rates, and those which did not improve to show a fall, yet there was a marked individual variation, and the average changes were well within normal limits.

The non-protein nitrogens showed variations so small that they are in all probability of little significance, yet the slight tendency of this constituent to rise in unimproved cases suggests that kidney function tests might well be introduced into a further series.

The blood sugars of cases of depression have been shown by Katzenelbogen and Friedman-Buchman ¹⁵ to lie generally within normal physiological limits, as did all of ours. The same authors and also Drury and Farran-Ridge ¹⁸ and Mann, ¹⁹ however, found a distinct departure from normal in the type of sugar tolerance curves obtained, in that they were usually higher and fell more slowly than the normal. Drury and Farran-Ridge and Mann also showed in recovering cases that a return to a more normal type of curve was associated with an improvement in the general condition, and this finding was common to most of the cases in the present series. Nevertheless, while it was true that the improved cases showed more normal curves it was also true that the unimproved cases showed not infrequently a tendency in the same direction, but to a lesser degree. The whole question, therefore, would appear to be a matter of a relative change rather than an absolute one, making it difficult or even impossible to base a prognosis on this finding alone. The fall of the fasting blood sugar is more marked in the improved than in the unimproved cases, but in both, before and after treatment, the values lay within the limits usually considered normal.

The blood calciums present a somewhat different picture. Huhnerfeld ¹² and Koppers ⁵ maintain that it is definitely raised in depression; Katzenelbogen and Goldsmith ²⁰ dealing with much larger series of cases, that it lies within normal limits (8.1-10.9 mg. per cent). Parhon and Werner ²¹ found the average value in the types of psychoses we are considering to be between 10.2 and 11.5 mg. per cent. In our cases the calcium fell with two

exceptions between outside levels of 9 to 12 mg. per 100 c. c. After a course of hematoporphyrin these values did decrease on the average in the improved cases from 10.9 mg. to 10.3 mg. and in the unimproved from 10.8 mg. to 10.5 mg. per 100 c. c., but were still within physiological limits. Strecker, Palmer and Braceland⁶ found a similar fall in the one case they tested, Kuppers⁵ and Huhnerfeld¹² noted a general decrease in several. The fact, however, that the decrease occurs whether the case shows clinical improvement or not, detracts considerably from its value as a prognostic factor.

The blood picture in depressive cases raises a more debatable point. There is a fairly general opinion that many if not most of these cases show some degree of secondary anemia, yet most of our cases showed a red and white count and hemoglobin of practically normal value. Huhnerfeld¹² believes that hematoporphyrin helps to build up the blood counts and hemoglobins where they are low, and that this change precedes the mental improvement. In our improved cases this change in the blood picture did occur in many instances though the reverse took place in Case 3. In our unimproved cases, however, a distinct fall in the hemoglobins and also in the red counts was rather the rule than the exception. Strecker, Palmer and Braceland⁶ observed a similar occurrence in some of their cases, which if confirmed in future studies, would raise a question as to the hitherto unquestioned complete safety of the treatment.

Summarizing these results, it does not appear that there is any laboratory test of definite value in prognosis as to the success of the treatment, or that there is at present any satisfactory method of selecting cases which will benefit from the exhibition of hematoporphyrin from amongst those depressions in which it will be of no effect.

In attempting to explain the action of hematoporphyrin, Huhnerfeld¹² pointed out that the calcium level was definitely reduced and regarded this as an important indication that the treatment was not merely symptomatic but dealt with the more fundamental conditions which produce the mental depression. In this assumption he has been followed by Vinchon¹⁰ in France and by Kuppers⁵ in Germany. The present study, however, shows that while the calcium level is definitely lowered under hematoporphyrin treat-

ment, this decrease is not necessarily accompanied by any clinical improvement, nor are the blood calciums of depressions especially high. In one case (No. 9) where the calcium was above the accepted clinical average value (it was 12.8 mg. per 100 c. c.), it was reduced under hematoporphyrin treatment (to a level of 11.5 mg. per 100 c. c.) with only a very transient clinical improvement; and though the drug therapy was continued the patient did not improve. Whatever may be the significance of this type of finding, it does not seem to indicate any very close relationship between the calcium level and the clinical picture. In this connection Kuppers⁵ points out that not only the calcium but also the potassium and the blood sugar levels must be reduced before improvement can be regarded as probable. Another explanation advanced by Boyd¹⁴ involves the possibility that hematoporphyrin by absorbing light energy becomes unstable, breaks down, and passes over part of its energy to the protein. Up to the present no definite confirmative evidence has been offered for these hypotheses, but the researches of Hutschenreuter²² in animals seem to indicate that hematoporphyrin given by mouth appears in the feces in amounts proportional to the amounts given, and hence that it undergoes little if any decomposition in its passage through the body, suggesting that it acts rather as a catalyst than as a reagent. Obviously the method of action of hematoporphyrin is as yet unsettled and in the present uncertainty, further investigation is indicated in the light of the accumulating clinical evidence that it is of definite benefit in the depressive psychoses.

SUMMARY.

1. Forty-one cases of which depression was an outstanding symptom have been treated with hematoporphyrin, with laboratory controls. All the cases were under hospital care; by far the majority of long standing; and many had had previous courses of treatment of various types without any improvement.

2. Of this series 14 were manic-depressives of the depressed type, 1 manic-depressive mixed, 11 involutional melancholias, 9 schizophrenics, 3 psychoneurotics and 3 miscellaneous with some organic factors.

3. Six of the manic-depressives, 1 schizophrenic and 1 psychoneurotic recovered or were much improved; of the balance 10 were improved, 5 showed slight improvement, and 18 were unaffected.

4. In all cases improved and unaffected, the blood calcium level and the blood sugar level fell, though all these occurred to a more marked degree in the former group. The sugar tolerance curves fell in the improved group and to a less degree in some of the unimproved cases, though it remained constant or even rose in some of the latter. The improved cases showed a slight loss of weight or at most a very slight gain, while in the unimproved cases the weight in general definitely increased. The basal metabolic rate increased slightly in the improved cases, but in the majority of all cases was within normal limits. The N. P. N. increased very slightly in the cases which did not improve, but fell correspondingly little in those cases which recovered or were improved. There was a general tendency in all cases to a decreased white blood count. In the improved cases the red counts increased, while it fell in the group which remained stationary; the hemoglobin value was unchanged in the former and fell in the latter.

CONCLUSIONS.

1. No satisfactory explanation based on experimental evidence of the action of hematoporphyrin has yet been evolved.

2. The laboratory tests are of little if any value in selecting cases for treatment or gauging their progress under treatment.

a. The blood calcium is reduced by the drug whether the case be clinically improved or not, but both before and after treatment is usually within normal limits.

b. The blood sugar tolerance curves assume a more normal configuration after treatment than before it. The blood sugar falls during treatment, but is within normal limits before and after it.

c. The blood picture is not characteristically affected. The white counts usually fall in all cases, but the red count and hemoglobin falls in clinically unimproved cases and rises or remains unchanged in treated improved cases.

3. The weight remains unchanged or improved under treatment. In only three cases was continued marked fall apparent.

4. No toxic effects were observed, and as far as the present series shows there is no danger of skin reaction from exposure to light.

5. With one exception, no clinically unfavorable sequels to treatment appeared.

6. Improvement, if it does occur, takes place early in the course of treatment. If one course fails, later series, even in much increased dosage, are not successful.

7. In our cases clinical improvement established during a course of hematoporphyrin treatment appears to be maintained or continues after the drug is withdrawn.

8. Taking into consideration the unfavorable outlook of many of the cases treated and the fact that many had had previous unsuccessful therapy, it would seem that hematoporphyrin is of definite value in the treatment of symptomatic depressions. While the results are unquestionably better in the milder cases, the method has proved of very positive benefit in certain cases of apparently malignant character, and would seem to be well worthy of trial in any case in which depression is an outstanding symptom.

NOTE.—The writer desires to take this opportunity to express his thanks to Dr. C. C. Burlingame, Psychiatrist-in-Chief of the Neuro-Psychiatric Institute, for his helpful criticism in the preparation of this paper. Without his friendly assistance the research could not have been undertaken, nor presented in this form.

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DISCUSSION.

DR. ROBERT B. MCGRAW (New York City).—Anything that gives promise in the matter of treatment of the manic-depressive reaction is of value because it seems pretty evident that this symptom complex is one of the most resistive and elusive in psychiatry. By the results in all our symptomatic depressions I feel that we cannot be very much impressed as so many things seem to turn the scale toward recovery. One patient who was apparently very much benefited by hematoporphyrin retained some symptoms, among them sleeplessness, and this same patient was cured by lactose capsules.

This medication, hematoporphyrin, should be used in hospitals where the same patients are coming or have been seen in several attacks, and it should be used the second or the third time. I have had opportunities of using it the second time in one patient and whereas there seemed to be improvement the first time there was no improvement the second time. The influence of suggestion seems to be not a small one apparently.

In private practice it is a rarity to see patients of the recurrent type in several attacks. I think it is a rarity to see them in private institutions; they go somewhere else, they go to some other doctor and they have a new type of treatment each time. In the state institutions, however, they come back to the same hospital because they have to come back.

If this drug is useful in the subsequent attacks, it is more important evidence I think, of its value.

To emphasize the influence of suggestion, I have a patient whom I have seen in six or seven different attacks. He had them pretty regularly every 15 or 16 months. He missed a manic attack in 1929. He is in a stock exchange position. This year he is apparently missing another attack and he has had to assume greater responsibility. Therefore, I wish to emphasize that fortuitous and spectacular occurrences in the environment sometimes seem to change the pattern considerably.

It is noteworthy in this particular study that the metabolic and physiologic studies were made because certainly in the clear-cut so-called typical affective reaction types the physiological component is pretty important it seems. Some of these people can be called, and are called by the internist, essential hypertensives. They often die of vascular accidents, of coronary or cerebral occlusion or thrombosis.

I would suggest that blood pressure studies as a simple measure might be useful in studying the effect of the hematoporphyrin and in studying the total effect on the reaction.

My own results in the use of hematoporphyrin on a smaller series has not been as satisfactory as has been noted in any of the studies given. I have mentioned one or two. I think, however, that the use of the substance should be continued, in order that we may build up a body of knowledge about its action. It might also perhaps be useful to use this same substance in the manic cases as a control.

DR. CHARLES F. READ (Elgin, Ill.).—In the therapy of these depressions, as the other discussants have said, we clutch at straws and for that reason, and with considerable apologies to ourselves, we have undertaken the treatment of a group of such cases at Elgin with hematoporphyrin. In the case of treatment of this kind perhaps it is just as well to accumulate evidence of the cases treated.

Our series has not been analyzed as yet. It amounts to 12 or 15 cases. We undertook the treatment with no hope of obtaining any results. We obtained no results in the first 10 treated and we were then pleasantly surprised by the improvement of three cases in which we had looked for none.* One of these to be sure was manic, but with the decided involutinal coloring, who had gone on with her psychosis for about a year. One case

* November 20, 1935: "The cases of improvement later relapsed and we have definitely concluded, from our experience, that hematoporphyrin treatment is useless."

had lain for months in a ball, as it were, under the sheets of her bed and she is now up and in contact. The other two are improved.

Our examinations, blood chemistry and blood counts, have revealed nothing of importance to our minds. We have found no decided fall in the calcium; some fall in the sugar; no particular change in blood count.

DR. HAROLD D. PALMER (Philadelphia, Pa.).—We have been very much interested in the study of the effects of hematoporphyrin in the psychoses. I think we have treated slightly more than 100 cases up to the present time, but certain questions have arisen in my mind in listening to Dr. Angus this morning.

Dr. Angus, have you made any attempt to test out the photosensitizing power of this commercial product on laboratory animals? Do we know, for example, that this product we are using is a photodynamic substance? Does it sensitize experimental animals and do we know that it sensitizes our human patients to light? Is there a therapeutic effect due to the photosensitization produced by the hematoporphyrin? Is it not possible that since hematoporphyrin promotes the cellular perspiration or the oxygen uptake of the cells that the effect might be just as efficient without light exposure?

Did any of your patients suffer from photophobia? After all, the most photosensitive tissue in the body, the retina, might be the first to show a photosensitized effect. I might say that in a number of our cases we did produce photophobia, particularly in blonde or auburn haired individuals. I am wondering if you had the same experience.

Fourth, was there any specific evidence of improvement with the drug which was followed by loss of the clinical gains after withdrawal of the drug? That is, did any patient make an improvement for a 10-day period with the drug, then was it withdrawn and did the patient show rapid decline? When the drug was resumed did the patient rapidly improve again? Did any patient decline again after the drug was finally withdrawn at the end of what was thought to be a full course of treatment?

DR. LESLIE R. ANGUS.—First, I shall try to answer some of Dr. Palmer's questions. To take up the last one first: were there any cases in which photodyn was given to the patients and they improved, but the improvement stopped when the photodyn was discontinued? We did have one or two such cases. That, frankly, was very uncommon. Most of them when they did show an improvement continued to maintain that improvement when the photodyn was stopped.

Replying to the next question, none of our patients suffered from photophobia. Of course we did not have the unusually light-haired individuals of whom Dr. Palmer spoke. We did not have any who complained of photophobia and we did not observe any sensitizing effect on the skin.

The first and second questions as to whether the commercial product has a photosensitizing power and as to whether the response on the part of the patient is due to the light effect are points far from settled. Certainly

as far as our investigations go there does not seem to be any special indication that the light has a great deal to do with recovery, although, of course, that is what Huhnerfeld's original statements were, and as I remember in some of the cases that Dr. Palmer reported earlier it did seem to have quite a distinct effect.

I do not know whether the commercial product is photosensitive or not, but I do know that it is hematoporphyrin. An independent analysis has established this fact, so that presumably photodyn has the general properties of hematoporphyrin, including photosensitivity.

I think the point that one of the other discussants brought up that a great many other people have been trying to use this drug and have had negative results is quite true. It is true, of course, of any new form of therapy. I think it would be a very excellent thing to collect all the results, both good and bad, and sum them up together with as careful laboratory controls of all types as we can get.

The suggestion that blood pressure studies be incorporated, I think, is a good one.

The problem that Dr. McGraw brought up about the possibility of using this drug in manic cases is one that we have thought of very frequently indeed. We have never actually done it merely because we have not had the time. If the manic-depressive group are one, as we believe, whether they are depressed or excited, then this should produce benefits in the manic cases likewise.

We have not treated any recurrent attacks and when I said that repeated courses had no effect, or that giving a second series later had no effect, I did not mean it to apply to a recurrent attack. I did mean that if photodyn were given in one attack with no improvement, and then after a period of months (in one case nearly a year and in all the cases more than three or four months) a second course were given in the same attack, the second series apparently produced no effect whatsoever.

HEMATOPORPHYRIN TREATMENT OF SEVERE DEPRESSIONS.*

By D. LOUIS STEINBERG, M. D., ELGIN, ILL.

The use of hematoporphyrin as a therapeutic agent in the treatment of depressions—involucional melancholia, manic-depressive-depressed phase and endogenous depression—was first instituted by Huhnerfeld⁷ and reported by him. Subsequently, other investigators have used this form of therapy, the majority reporting favorably. It is only within the last two years that there have crept into the literature reports that do not coincide with the findings of the earlier workers in this field.

Hematoporphyrin (trade name—photodyne) is a decomposition product of the hemoglobin normally present in the blood stream in small quantities. If increased through disease or chemical poison it becomes very toxic. It is excreted by the body through the urine and feces. It is prepared commercially from the blood of the horse.

Strecker and Palmer¹² have called attention to the fact that the literature contains 24 cases of acute hematoporphyrinemia and that the symptoms presented were those of acute ascending paralysis (Landry) and mental symptoms in the form of visual and auditory hallucinosis. They have also called attention to the fact that Garrod and Templeton and Lunsford have noted that there is some difference between the photosensitizing effects of the artificial and the endogenous hematoporphyrin.

THEORY.

The theory for the action of this chemical is very vague and some of the workers disagree upon the exact mechanism of its action.

According to European investigators, hematoporphyrin sensitizes the tissues to light and thus conveys stimuli to the vegetative nervous system. Through the sympathetic centers there is then produced an elevation of spirits and release from inhibitory ten-

* From the Elgin State Hospital, Elgin, Ill.

sions, thus overcoming the supposed diminished neuromuscular irritability which has been noted in the endogenous depression.

According to Boyd,³ when oxygen is present and united with the hematoporphyrin molecules, it oxidizes them and passes its energy over to them. The hematoporphyrin molecule thus becomes unstable and decomposes. Regarding the exact steps from here to the apparent therapeutic action, no reasonable explanation has ever been offered.

LITERATURE.

Both Hausmann⁶ and Huhnerfeld,⁷ working independently with rats, mice, rabbits and pigs, reported an increase in the liveliness of the animals and in their responses to stimuli following injection of small amounts of hematoporphyrin. They also reported that the animals showed a marked gain in weight, following the use of the drug in small doses. Huhnerfeld,⁷ working with pigs, showed that the calcium level in the blood was reduced during the time of medication.

This experimental work was thus transferred for a trial to human beings. It was first used by Huhnerfeld⁷ in 13 cases of depression. Excellent results were obtained in 11 cases; 2 showed no change. Since then there has been reported in the literature a total of 141 cases—by Huhnerfeld,⁷ Becker,² Hartman and Weissman,⁵ Vinchon and Bourgeois,¹³ Vinchon and Kueppers,⁹ Strecker and Palmer,¹² Giehm,⁴ Notkin *et al*¹¹ and Angus.¹ The psychoses of the patients treated included mild depressions, manic-depressive-depressed phase, psychasthenia with depression, involutional melancholia, epilepsy with depression, mild schizophrenia and dementia præcox.

Of course, in evaluating therapy it is difficult to form definite standards of what is meant by improvement, especially when summarizing the reports of different workers. Therefore, adhering to the descriptions of the various investigators, we subdivided the total group of 141 into improved, partially improved and unchanged, and found that 71 patients were considered improved, 22 partially improved and 58 showed no change. In the last named group are found predominantly the schizophrenic and dementia præcox cases. Such a classification is subject to considerable error, but we believe that roughly it represents the opinion of the various workers, that is, that hematoporphyrin has a definite beneficial

effect in the depressive psychoses. It has also been reported that changes are produced in the blood calcium, potassium, phosphorus and the blood cell picture.

Only recently a report striking a decidedly unfavorable note, contrary to the almost unanimous approval of previous investigators, has appeared. This is the report of Notkin *et al*,¹¹ who treated 10 cases of involutional melancholia and 10 cases of dementia præcox and who also obtained laboratory check-up of B. M. R. and blood counts. Only one case in the entire group of involutional melancholia showed any considerable clinical improvement; three showed a mild transitory improvement and the other six none at all. None of the dementia præcox patients showed any improvement. Slight variations of weight were noted in both the involutional melancholia and dementia præcox groups. Insignificant changes were noted in the B. M. R. values. Improvement of the blood picture was noted at the end of treatment in the involutional melancholia patients. Another dissenting report is that of Angus¹ who found that the clinical results obtained in the treatment of patients with hematoporphyrin were not as impressive as those of earlier investigators and that equally beneficial results were obtained with other forms of treatment. The results of his laboratory check-ups, however, were fully in accord with those of previous workers.

CLINICAL STUDIES.

In view of the favorable reports, we decided to make use of hematoporphyrin therapy in the treatment of our depressed patients, especially in the involutional melancholia and manic-depressive-depressed patients. The patients selected comprised five diagnosed involutional melancholia, eight manic-depressives and one undiagnosed psychosis. There were 11 women and three men, the number of patients having necessarily been limited because of the high cost of hematoporphyrin as compared with that of other medications. They all had in common a severe depression with marked depressive ideation. Some of the cases diagnosed manic-depressive had had previous attacks from which they apparently had recovered. The age range was from 35 to 59; the duration of the psychosis from 3 to 30 months prior to starting hematoporphyrin therapy. All contraindications were ruled out. A perusal of the

case reports to follow will acquaint one with the peculiar symptomatology of each case. Here again the question of diagnosis enters into the evaluation of results. However, the diagnoses here given do not represent the opinion of one examiner. All these patients had been presented before the medical staff whose psychiatric experience ranges from 4 to 25 years of active practice. Usually from 4 to 10 opinions are expressed. The majority of concurrences determines the final diagnosis. Regardless of the diagnosis, these patients were chosen because their symptomatology and physical condition placed them in the group which resembled most closely the type of patients that had been reported as most greatly benefited by the use of this special form of medication—hematoporphyrin.

In all our cases we attempted to follow closely the accepted procedures of the various workers in this field. We administered the medication both by intramuscular injection and orally. A course of injection therapy consisted of 10 injections of 1 c. c. of hematoporphyrin (2 mg.) given every other day for 20 days, then a rest period ranging from 8 to 28 days, the majority being 14 days, during which time the patient received oral medication, 10 to 15 gtts. t. i. d. and finally another course of 10 injections of 2 c. c. given every other day for a period of 20 days. As this drug is supposed to be efficacious when administered orally, we gave patients 4 and 8 medications by mouth only starting with 15 gtts. t. i. d., increasing 1 gtt. daily until patient received 30 gtts. t. i. d., then decreasing by 1 gtt. daily until the patient was again receiving 15 gtts. t. i. d. and then kept at this level for 14 days more, giving the patient a total of 45 days of therapy. Patients 1, 3, 4, 7 and 8 had a second complete course of therapy. Each patient received what is generally considered an adequate amount of therapy and patients 1, 3, 4 and 7 received in addition small doses of tincture opii while patients received ultra-violet exposures simultaneously with the administration of hematoporphyrin. Patients 1, 2, 3, 4, 5, 6, 7 and 8 were housed together in one cottage so that at least for these patients the external conditions under our control were equalized.

At the same time we decided to check some of the laboratory changes that are supposed to be induced by the use of this drug, mainly changes in the blood electrolytes such as calcium and the

blood count. In addition, samples of blood of the first 8 patients in our series were submitted to the ultra-microscopic examination before and after treatment according to the method of McDonough.

The clinical results of the hematoporphyrin treatment of the 14 patients are summarized in the attached case histories; the laboratory findings are given in Tables I and II.

TABLE I. BLOOD CHEMISTRY CHANGES IN 8 PATIENTS.

B. Before Treatment Was Instituted.

A. After Treatment Was Discontinued.

Case No.	Blood Chemistry.							
	Calcium.		Blood Sugar.		N.P.N.		Cholesterol.	
	Mgm./100 c. c.		Mgm./100 c. c.		Mgm./100 c. c.		Mgm./100 c. c.	
	B	A	B	A	B	A	B	A
1	11.03	11.0	71.43	94.3	29.6	26.6		
2	12.9	11.5	88.8	74.0			240.	220.
3	11.9	11.3	81.63	86.9	32.9	29.1		
4	11.05	10.6	105.26	79.0	35.3	35.6	233.	160.
5	10.6	11.12	78.5	100.	37.5	30.4	200.	160.
6	11.0		83.3	88.8	28.6	40.3	195.5	188.6
7	10.15	10.9	66.66	62.5	32.2	43.0	173.3	110.
8	11.9	12.5	71.21	74.0	28.1	34.0	167.5	150.8

TABLE II. BLOOD CELL CHANGE IN 5 TREATMENT CASES.

B. Before Treatment.

A. After Treatment.

Case No.	Blood Count.								
	Red Cells.	White Cells.	Hb.	Seg.	Stab.	Lymp.	Eosin.	Mono.	Baso.
1.... {	B 3,500,000	7,000	85	55	1	43	1	..	..
1.... {	A 3,400,000	5,800	66	59	2	35	..	4	..
4.... {	B 4,700,000	11,400	90	64	4	30	..	2	..
4.... {	A 4,000,000	8,950	81	76	1	21	..	1	..
5.... {	B 4,300,000	6,400	91	57	1	42	..	..	..
5.... {	A 3,700,000	9,200	92	56	2	42	..	..	..
6.... {	B 4,500,000	5,000	95	53	1	42	1	1	2
6.... {	A 4,600,000	6,800	91	67	2	30	1	..	..
8.... {	B 4,350,000	7,600	88	64	2	34	..	..	..
8.... {	A 3,000,000	8,800	89	64	0	32	..	..	2

Of the 14 patients treated for periods ranging from three to six months, only one case ⁴ showed improvement in both her physical and mental spheres. The duration of this improvement was about

six weeks when coincidentally with the development of a pleurisy with effusion, the patient soon regressed to her pre-therapeutic level. Another patient,⁹ diagnosed manic-depressive, showed a gradual improvement after photodyne therapy had been discontinued. She continued to adjust on a low level in the institution and occasionally would revert to behavior typical of her condition at the time of admission. It is doubtful whether we can attribute even these temporary and sporadic improvements to the photodyne treatment since in one instance (Case 4), the patient, diagnosed involuntional melancholia, had made during a previous hospitalization a similar improvement but of much longer duration, and in the second instance the intermittent improvements did not coincide with the hematoporphyrin treatment. In fact, even adverse effects were noticed—in some of the remaining 12 cases the original pathological manifestations seemed to be intensified. Notkin¹¹ observed similar adverse effects in some of the patients in his series.

Kueppers⁹ published very interesting chemistry changes in the blood following hematoporphyrin therapy. Referring to Table I, it is interesting to note that our calcium readings before treatment are far below the level of those obtained by Kueppers. We used the method of Tisdall. A comparison of the before and after readings readily shows the slight changes produced and their ambivalent trend. Patients 11, 12 and 14 which are not charted gave similar results and in Case 13 an original reading of 6.76 mg. was raised to 9.58 mgs. at the completion of therapy. Cases 9 and 10 had no check-up following therapy.

Again referring to Table I, we note that the blood sugar and N. P. N. levels show similar indeterminate results. It is only in the cholesterol level that we note any agreement in a tendency to a lower level following therapy. In view of these findings, we are forced to conclude that in our experience calcium, sugar and N. P. N. levels in the blood are not equally responsive in all patients and do not follow the trends reported by other workers; and that only in blood cholesterol is there observed a definite trend to a lower level.

The influence of photodyne on the blood cell picture has also been noted by several investigators. We obtained blood counts for the first eight patients. The values for patients 2, 3 and 7 are omitted from Table II because readings were not made at termination of treatment. Inspection of Table II shows that there are

four instances where the red count was lowered and one instance of slight elevation following treatment and two instances where the white count showed lower readings and three where it showed increases. Thus again our findings fail to corroborate the almost uniform findings of previous investigators. None of the patients where McDonough blood examinations were made showed any striking changes in the before and after studies.

In none of these patients, with the exception of Case 7, did we observe at any time symptoms of toxicity that we considered definitely associated with the administration of photodyne. Following her first course of 10 injections and the oral therapy, Case 7 developed an extensive furunculosis of the skin. Therapy was therefore discontinued, following which the skin infection cleared up. After a short rest period, this patient was again started on photodyne and completed an entire course without any further sign of toxic reaction.

It is quite evident that our experience with hematoporphyrin treatment in the depressed psychoses has not revealed nor even suggested beneficial clinical or somatic results. We can not ascribe to it any special benefits to the patients in either the physical or psychic fields. Our laboratory check-up is indicative of no special or specific influence exerted on the blood electrolyte or the blood count. We, therefore, have discontinued using the drug until further bio-chemical investigation reveals a more definite indication for its use than vague theories, or suggests new clues as to its nature which will warrant its use on empirical grounds.

COMMENT.

The theory and experimental work have been discussed by nearly every one who has reported on the use of hematoporphyrin, and since there has been no new development no further comment is necessary.

It is of interest though to note that our cases were all of severe depression—both the manic-depressive and the involutional melancholia patients, and as Giehm⁴ pointed out, "photodyn seemed to be of no value in cases of melancholia where fear was a prominent symptom," but in contradiction to this conclusion Becker² states "that in true endogenous depressions photodyne seems never to fail." Strecker and Palmer¹² cite as one of the more specific

evidences of the therapeutic value of hematoporphyrin the fact "that in a large number of patients prompt improvement occurred during the first course of treatment, but when the drug was stopped . . . a definite decline was evident," and that "prompt improvement again was obvious when treatment was resumed." They note also that the most satisfactory gains were obtained in the benign unhospitalized depressed patients, and they mention the possibility of suggestion as a factor.

Another reported evidence of beneficial influence is a gain in weight and changes in the blood electrolyte values.

It is again quite evident that our own experience with this drug failed to produce in patients of severe depressions any of the above signs of therapeutic value, and therefore we must conclude that photodyne therapy is not indicated in the severe depressive psychoses and that in some cases it is definitely contra-indicated because of its apparent ability to aggravate the symptomatology presented by the patient.

SUMMARY.

1. Reports in the literature of the use of hematoporphyrin in the depressed psychoses were for the most part favorable.

2. There are by no means clear theories as to the physiological action of the drug.

3. Experiments with laboratory animals indicated a definite influence on the weight and an increased response to stimuli.

4. Laboratory studies had shown a tendency of the drug to elevate the blood count and to reduce the calcium level.

5. Fourteen patients in all were treated adequately with hematoporphyrin.

6. Two patients responded well, one of whom relapsed after a period of six weeks. The other continued to adjust on a low level.

7. Laboratory examinations failed to disclose any specific influence on the blood picture except a tendency to lowered cholesterol levels.

8. Our results do not warrant the use of this therapy in preference to any of the old armamentarium used in the treatment of depressed psychoses.

9. The use of this drug did not produce any deleterious toxic reaction.

CASE SUMMARIES.

1. Age 53. Hysterectomy in 1928; thyroidectomy in 1930. Mental symptoms began June 1933; thought she was infected and had infected her son; depressed, resistive, tube fed, usually mute. On admission condition unchanged; marked hypertension; considerable treatment without success. Diagnosed involutional melancholia. Photodyn therapy begun December 31, 1934, received one complete course of injection therapy along with tincture opii and simultaneous exposure to ultra-violet ray. No change whatever in behaviour. Laboratory examination—sedimentation rate rapid; no change in refractive index or viscosity, or ultramicroscopic picture of protein particles.

Conclusions.—Treatment adequate and without noticeable effect, physically or mentally.

2. Age 35. Manic-depressive. Present attack began November 1934 with bizarre behaviour, apprehension, depression, impulsiveness and negativism. She was undernourished, hyperactive and violent. Therapy begun April 1, 1935, completed May 29—one complete course of injection therapy. She became more catatonic like; in the course of treatment began to talk, but in a scattered, delusional manner. Laboratory examinations of urine were negative. Sedimentation at close of treatment was delayed; refractive index remained constant and the ultramicroscopic picture unchanged.

Conclusions.—This may be a case of mistaken diagnosis, possibly catatonia rather than manic-depressive. Treatment was without any appreciable effect aside from slight, insignificant changes in blood chemistry.

3. Age 40. Onset 3 weeks before admission in October 1934; began to talk about having sinned, seemed perplexed, depressed, resistive and seclusive. Diagnosis not made. Continued to express ideas that she had sinned. Photodyn therapy started December 1934; 10 injections 1 c.c. and 15 drops t. i. d. by mouth for 2 weeks. She was then placed in bed because of edema of the feet and continued to be depressed, retarded and untidy. A full course of therapy begun March 11 was completed May 6—tincture opii also given. At the end of the course she seemed very slightly improved. Laboratory studies—urine negative; sedimentation remained delayed; refractive index and viscosity showed no changes and the ultramicroscopic picture unchanged.

Conclusions.—Treatment was adequate and no beneficial effect was noted either mentally or physically.

4. Age 59. First admission September 4, 1931. Diagnosis—involutional melancholia. Discharged improved March 1932. Returned April 1934—showed restlessness, purposeless activity. Diagnosed manic-depressive psychosis, mixed type. Received considerable therapy without manifesting any change in mental picture. Patient started on photodyne therapy January 9, 1935—one complete course of oral therapy; completed February 22, 1935, received ultra-violet exposure daily during photodyn therapy. Patient improved; decrease in depression, agitation, cooperated with ward routine; although still complained of feeling an urge to be doing things, she neverthe-

less controlled this. Had good insight and gained weight. Patient started on another course of photodyn therapy on March 11, 1935, same as above, and completed April 24. On April 8, patient developed left sided pleurisy with effusion and coincidentally began to regress and at end of photodyn therapy patient was about the same as in January. Laboratory examination—no change in urine; sedimentation rate rapid; no change in refractive index, viscosity or in ultramicroscopic picture of protein particles.

Conclusions.—Treatment adequate, improved mentally and physically for period of 6 weeks, then returned to former level.

5. Age 46. Mental symptoms noted June 1934; somatic delusions, depression, restlessness and hopelessness; admitted September 1934—apprehensive, had ideas of sin, marked loss of weight, had to be force-fed, showed some tension. Diagnosed involuntional melancholia. Patient had considerable therapy with no change occurring. Photodyn therapy begun April 1, 1935—one complete course of injection therapy; completed May 29, 1935. Received ultra-violet exposure daily simultaneously with therapy. Mental picture remained the same; lost weight. Sedimentation rate, refractive index, viscosity, ultramicroscopic picture of protein particle showed no change.

Conclusions.—Treatment adequate without any beneficial influence on mental or physical status.

6. Age 44. Tainted heredity; mental symptoms noted in 1933; January 1934 attempted suicide, was agitated, killed a pet canary; admitted September 21, 1934; showed indecision, perplexity, retardation, somatic complaints and was a feeding problem. Diagnosed involuntional melancholia. Had considerable therapy with no effect. Started on photodyn therapy April 1, 1935—received one complete course of injection therapy and ultra-violet exposure simultaneously daily during the course. Sedimentation rate, refractive index, viscosity and ultra-microscopic picture showed no change.

Conclusions.—Treatment adequate with no beneficial effect on mental or physical status.

7. Age 53. Twenty years ago had depressed period, recovered after 2 years. Present mental symptoms occurred in 1933; agitated, depressed, expressed the idea of doing wrong, considerable tension. Admitted October 10, 1934. Diagnosed manic-depressive, mixed phase. Physically was poorly nourished and a feeding problem. Had considerable therapy with no improvement. Started on photodyn therapy December 2, 1934—10 injections intramuscularly of 1 c.c. each, then 15 drops t.i.d. for 2 weeks and then 2 injections of 2 c.c. each. Therapy was discontinued because of multiple furunculosis, January 9, 1935. Started on treatment again March 4—completed an entire course of oral therapy on April 18, 1935; received small doses of tincture opii and ultra-violet exposure at same time. Laboratory examination showed no change in urine and no appreciable change in sedimentation rate, refractive index, viscosity and ultramicroscopic picture of protein particles.

Conclusions.—Therapy was adequate but no indication of any beneficial effect on mental or physical status.

8. Age 45. First admitted in 1925, restless, removed her clothes, combative, out of contact. Diagnosed dementia praecox, hebephrenic type; discharged improved February 1926. Adjusted fairly well except for mild depressed periods at yearly intervals. In September 1933, patient became restless, refused to eat, careless of appearance, cried, hallucinated, was somewhat fearful, and expressed the idea that she was being blamed for everything. For most part patient has been in bed since then. Had to be spoon fed. Diagnosed manic-depressive, mixed type. Photodyn therapy begun January 8, 1935—received two complete courses of oral therapy up to April 24, 1935, also ultra violet exposure daily. Lost weight. No change noted in sedimentation rate, refractive index, viscosity and ultramicroscopic picture.

Conclusions.—No influence of therapy was noted on mental or physical status of the patient.

9. Age 45. Admitted September 5, 1934; had short period of depression 16 years ago following birth of her first child, from which she recovered in 3 weeks. At that time threatened suicide. Present attack started March 1934 following an injury to her face, characterized by self-accusatory ideas, depression and agitation. Menopause 6 months before admission. On admission patient was very depressed, retarded, said she was in the hands of the devil. Diagnosed manic-depressive, depressed. Frequently lay on the floor or slumped on a bench or in a chair; was untidy in personal habits. At the time photodyn therapy was instituted mental condition was poor. Received one complete course of injection therapy; completed this on April 10, 1935.

Conclusions.—Following completion of this course patient began to improve and at the present time is more alert, tidy in habits, exhibits more spontaneity and is interested in her appearance.

10. Age 54. Diagnosed involutional melancholia. First mental symptoms noted September 1933; complained of insomnia, expressed the idea that she had done wrong, thought the family was going to be killed, made several attempts at suicide, taken to a private sanitarium, began to eat poorly and refused to recognize the family. Here she was depressed and expressed the idea that she was to be killed and had a hopeless outlook. Patient was started on photodyn therapy December 29, 1934—received one complete course of injection therapy by February 21, 1935.

Conclusions.—Treatment was adequate. This patient showed no marked change following therapy excepting that she was more responsive to questions.

11. Age 55. Diagnosed manic-depressive psychosis, depressed phase; onset of mental disease was in 1932. Patient began to express the idea that someone was talking to her, threatening her, had crying spells, became careless of her personal appearance and slept poorly. Here she had a moderate hypertension, was depressed, retarded, showed some defects in memory and threatened suicide. Patient was started on photodyn therapy December 29, 1934—received one complete course of injection therapy. This was completed February 23,

1935. Laboratory examination showed a blood calcium of 11.05 before treatment and 11.1 at completion of the course.

Conclusions.—Adequate treatment. There was no change in patient's mental or physical status or blood calcium.

12. Diagnosed manic-depressive, depressed phase. First attack noted in 1920, lasted 2 months. Was depressed, talked very little, lost interest in her surroundings, not hospitalized at that time. Second attack in 1930. This time in addition to the above symptoms had some mild self-accusatory ideas, ate poorly. In 1932, patient had a third attack; similar symptoms; has been hospitalized since then. Patient started on photodyn therapy on January 22, 1935; completed April 3, 1935—received one complete course of injection therapy. Laboratory examination showed blood calcium 11.39 before treatment; 10.1 at completion of treatment.

Conclusions.—Treatment was adequate; no change in physical or mental status was noted; a decrease in blood calcium was effected.

13. Age 54. Diagnosed involutional melancholia; first mental symptoms noted in October 1932; patient had somatic complaints, was depressed, restless, had ideas his family was against him, would cry easily, attempted suicide and was committed here December 17, 1932. Patient was paroled April 1933, made a good adjustment until August 1933, when he again began to worry and began to express ideas of reference that other people were watching him, became depressed, was afraid people would harm him, thought his food was being poisoned, had to be re-admitted November 23, 1933; symptoms continued. Patient was started on photodyn therapy February 3, 1935. Patient was uncooperative for oral therapy and therefore he received 20 injections of 2 c. c.; completed May 20, 1935. Laboratory examination showed a blood calcium of 6.76 and phosphorus of 3.99 before treatment was instituted; after treatment calcium was 9.58 and phosphorus 3.63.

Conclusions.—Patient had adequate treatment, was unimproved mentally or physically. There was a slight loss of weight and increase in the blood calcium.

14. Age 54. Diagnosed manic-depressive, mixed type. First attack of mental illness noted in 1910; lasted 13 weeks; recovered completely. Second attack in 1922, also recovered. Present attack September 1933 following minor automobile accident. Patient was worried, restless, attempted suicide. Here he is agitated, depressed, worried and retarded. Patient was started on photodyn therapy on January 18, 1935; received a course of 10 injections of 1 c.c. each every other day. This time patient developed a cellulitis of the left elbow and photodyn therapy was discontinued for a period of two months. Oral therapy 10 drops t.i.d. was started on May 1, 1935 and continued for a period of 28 days, then patient received a second course of 60 intramuscular injections of 2 c.c. each which was completed on June 20, 1935. Laboratory examination before treatment gave calcium 11.78; phosphorus 4.21; during treatment calcium 11.1 and phosphorus 3.92.

Conclusions.—Treatment adequate; patient unimproved mentally or physically. A slight loss of weight was observed.

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CRIMINAL BEHAVIOR IN THE LATER PERIOD OF LIFE.*

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Although it is generally observed that crime is a form of behavior most common to the young, that it shows a gradual increase in frequency in adolescence and a similar decrease after 40 years of age, the author believes that no adequate explanation for its later cessation has been presented.

A review of the scientific literature indicates that but little attention has been given to the medical aspects of criminal behavior. Except for notable isolated instances the interest is in the criminal in relation to the diagnosis and the treatment of disease. The medical indices over the last 15 years revealed only three references to studies of the older offender against the law. Strassmann¹ presented clinical and sociological studies of eight criminals ranging in age from 66 to 90 years. One of these had a long criminal record, another, an embezzler, had once before been charged with crime. The remaining six, including the 90-year-old, had no previous record of crime. Except for the embezzler all were charged with crimes involving sexual assault. In each instance the author pointed to the mental disease of the prisoner of which the crime was but a symptom. A second study of older offenders by Healy² deals with criminals who have not yet reached the period after 40 years with which this study deals. The third reference by M. Alexander suggests in its title that the author deals with the less serious offender after the juvenile period.

In addition to these references there have appeared from time to time reports of the control of crime through endocrine therapy.

* Read at the ninety-first annual meeting of The American Psychiatric Association, Washington, D. C., May 13-17, 1935.

¹ Strassmann, G.: Criminal deeds in senile mental debility. *Deutsche Ztsch. Med.*, 10: 346, Aug. 16, 1927.

² Healy, W.: Psychoanalysis of older offenders. *Amer. Jour. Orthopsychiatry*, 4: 24, Jan. 1934.

These reports though dramatic in character have so far been unconvincing. However, the promise such studies hold deserves further consideration and investigation.

In the face of this dearth of medical literature the sociologists and psychologists have written extensively. The former see the diminishing criminality of this later period as a part of a normal curve of distribution. Sutherland³ finds, "There is a gradual decline after the maximum until the age of 44 years, after which it drops rapidly." He adds, "But it is not to be inferred from this that old age is free from crime." A possibly significant relationship to type of crime is suggested by him with reference to studies of rape. Bowers⁴ found that of 175 cases of rape two-thirds were committed "by decrepit old men over 50 years of age." The frequency of rape was compared with grand larceny. Among men over 70 years, whereas rape occurred once in four, larceny was found only once in 150 cases. This tendency of persons not previously convicted to violate the laws late in life rather than in middle age is believed "may be due to senile dementia, to changes in the prostate gland, etc."

Earlier students of penology have suggested that crime is like a disease process. Goring is reported to have argued that "crime is like scarlet fever." Recently Richard Cabot compared crime to disease in discussing the apparent inability of the agencies of the community to control juvenile delinquency effectively. He suggested "that juvenile delinquency might be what physicians call a 'self-limited disease' which runs its course in the early adventurous, reckless years of youth and comes to a stand-still in middle life, when men begin to value their security more and their adventures less. This hypothesis is in agreement with the fact that we see so few middle-aged or elderly men in our prisons."⁵

Dean Kirchway, former warden of Sing Sing, has been impressed with the fact that among the prison population there are relatively few recidivists. In the face of studies by Sheldon and Eleanor Glueck which reveal that 80 per cent of prisoners continue in crimi-

³ Sutherland, E.: *Criminology*, p. 90. Lippincott, 1924.

⁴ *Ibid.*

⁵ Cabot, R. C.: 1000 Delinquent Boys. *The Survey*, Vol. LXX, No. 2, p. 39-40, Feb. 1934.

nal careers after release Kirchway holds that the number of recidivists in the prison population should be much larger.

Psychological publications on criminal behavior though dealing primarily with the measurement of intellectual abilities and disabilities have concerned themselves with the significance of age. Murchison⁶ observes that "approximately 88 per cent of the criminal group is composed of young men under 40 years of age." His conclusion, that "the older men either die or learn better methods," may, however, require further objective substantiation than is contained in his publication. Sociological studies revealed a greater incidence of sex crime in the later age group just as the psychological studies have done.

Kretschmer's studies of persons and classification by physical types has been followed by other investigations of criminals. However, no definite evaluation in relation to older offenders is available.

Why no further studies have been made of crime in this later age group may be due to the centering of interest on the part of investigators in the age when delinquency and crime have their inception. That there is a general, though not clearly defined, belief that the older age group bears a special significance to criminal behavior is, however, evident from the literature that is available. It is the purpose of this paper to study the records of the older group with particular regard to the following factors: Age, type of crime, nativity, color, education, intelligence, psychiatric findings and recidivism. The two following questions are raised: What is the nature of the person who commits crime after he is 40 years of age; and, second, What is the psychiatric significance of the diminishing frequency of criminal behavior in the older adult?

The material from which the study is made was collected from examinations of prisoners committed to the Illinois State Penitentiary convicted of felonious crimes. They are drawn from the entire state and are a part of the group admitted during the years 1934 and 1935. The number of cases investigated totals 486. The cases are unselected except for the fact that one-half are under 40 years, the other over 40 years.

We find those over 40 years make up 10.2 per cent of a total of 1083 serial admissions. In this larger group the maximum num-

⁶ Murchison, C.: *Criminal Intelligence*. Clark Univ. Press, 1926.

ber of prisoners are found in the 19-year age group, but the median is in the 24-year age group. The youngest man admitted was 15 years of age and the oldest 64 years of age. All crimes were classified under the following heads: Robbery, larceny, burglary, murder, fraud and sex. A small number representing less than 7 per cent which did not lend themselves readily to such groupings were placed in the miscellaneous group. (Table I.) We find that the larger proportion of crimes was among the murder, fraud and sex groups, in marked contrast to the distribution in a comparable group including all ages. In the murder group the proportion was two and one-half times larger than that for the same crime for the all-age group, whereas in fraud and sex the proportion was

TABLE I.

PRISON ADMISSIONS.

Crime	Over 40 years		All ages	
	No.	Per cent	No.	Per cent
Robbery	30	12.4	329	39.9
Larceny	24	9.8	154	18.8
Burglary	37	15.2	154	18.8
Murder	55	22.7	71	8.7
Fraud	40	16.5	40	4.8
Sex	40	16.5	32	3.8
Miscellaneous	17	6.9	43	5.2

four times greater. In the robbery group the reverse was true. There were three times as many admitted for robbery in the all-age group as in those over 40, twice as many in the larceny group. In the burglary group the difference was not so marked, although even here it was one and one-half times greater in the all-age group.

The native-born white makes up by far the larger proportion, representing 60 per cent. (Table II.) It is significant, however, that 18.9 per cent are of foreign birth, in contrast to the low percentage of this group among admissions of all ages. Nineteen per cent were native-born negroes.

The educational achievement of this group was only approximately determined as it depended upon the statement of the prisoner himself. As is characteristic for prisoners, there was a marked limitation of schooling. Only 14 men had any college

training whatever. Thirty-three reported high school training. The largest group, 133, fell in the range including fourth to eighth grades. Thirty-eight had achieved only the primary grades and 25 showed either no schooling whatsoever or there was an absence of any record of schooling.

TABLE II.
NATIVITY AND COLOR.
OVER 40 YEARS OF AGE.

	No.	Per cent
Native born white.....	146	60.0
Native born negro.....	47	19.0
Foreign born white.....	46	18.9
No record	4	2.1

The intelligence level of criminals was based upon the measurements obtained in the use of the Army Alpha group test, the use of the individual Stanford-Binet test for those falling below the dull group, and the use of the performance tests with the illiterate. (Table III.) The distribution of intelligence is par-

TABLE III.
INTELLIGENCE OF CRIMINALS.

	All ages		Over 40 years	
	No.	Per cent	No.	Per cent
Very superior	62	7.5	6	2.5
Superior	147	17.8	28	11.6
Average	327	39.5	88	36.3
Dull	156	18.9	30	12.4
Borderline	84	10.2	34	14.1
Mental defective...	51	6.2	58	23.9

ticularly significant in view of the large proportion who are found in the group of mental defectives. When compared with a group of prisoners of all ages this group is found to be almost four times as large. Whereas the mental defectives make up 23.9 per cent of prisoners in our study only 6.1 per cent occur in the all-age group. Although there is a general lowering of intelligence it occurs fairly uniformly throughout the various levels. Only 2.5

per cent are in the very superior group, as compared with 7.5 per cent in the all-age group.

Further inquiry into the significance of intelligence in relationship to the crime groups was made. (Table IV.) Here we found that this large proportion of defectives belonged primarily in the sex and murder groups. A similar low level was found in the burglary group. The distribution for the robbery group gave a fairly normal curve. In larceny virtually the same number of persons was found in each of the several levels of intelligence, except the very superior where there were none. The fraud group shows a distinctly higher intelligence level.

TABLE IV.
TYPE OF CRIME AND INTELLIGENCE.

Intelli- gence	Lar- ceny	Burg- lary	Rob- bery	Sex	Murder	Fraud	Miscl.	Total	
								No.	Per cent
Very superior ...	0	1	0	0	1	3	1	6	2.5
Superior	3	3	4	7	3	7	1	28	11.6
Average	5	14	15	9	19	20	6	88	36.3
Dull	5	4	3	6	5	6	1	30	12.4
Borderline mental defective ..	6	5	2	7	7	3	4	34	14.1
Mental defective ..	5	10	6	11	20	1	5	58	23.9
Total ...	24	37	30	40	54	40	17		

The psychiatric examination included in addition to interview with the prisoner, observation over a period of two to three weeks during the time that he was confined in the diagnostic depot in the Penitentiary System. It concerned itself not only with the study of gross psychopathology but also with personality traits indicative of the reaction of the prisoner to society. The psychiatric diagnoses are listed under eight categories. Prisoners were found to be distributed among them as follows: 37.4 per cent fall in the group classified as inadequate personality; 23 per cent are in the egocentric group; 11.9 are in the unstable group; 13 per cent were found to show distinct signs of psychopathy, of which the largest group was psychopathic personality, there being eight pris-

oners of the total number so classified. Seven were found to be psychotic and a like number classified as alcoholic deterioration, five as psychoneurotic, three as senile deterioration and two were epileptic. The psychiatric diagnosis of mental deficiency was made in six cases, representing 2.4 per cent of the group. Twenty-three, or 9.4 per cent, were found to be free from personality fault. Central nervous system syphilis was found in two cases and four were left undiagnosed.

As is well known, recidivism in prisoners is most difficult to evaluate. It is particularly significant, however, when the question of continued criminal activities is studied. Except for the previous record within a penitentiary or reformatory serious doubt must be raised as to the validity of record of other arrests

TABLE V.

PREVIOUS CRIME BY AGE GROUPS.

Years	No previous record		All convictions		All incarcerations		Prison		Total No.
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	
15 to 19.....	39	52.0	36	48.0	19	25.3	3	4.0	75
20 to 29.....	37	29.2	90	70.8	74	58.2	37	29.2	127
30 to 39.....	9	22.2	32	77.8	31	75.6	20	48.7	41
40 and over...	117	48.1	126	51.9	119	48.9	79	32.5	243
All under 40..	85	34.9	158	65.1	124	51.0	60	24.6	243

and convictions. In the record of previous penitentiary sentence accuracy is assured by the practice of reporting such incarcerations to the Federal Crime Bureau. The record of institutional commitments and convictions without institutionalization was charted as well as the penitentiary reports. There is considerable uniformity in these three kinds of records, indicating a fair degree of reliability. (Table V.) We find that for our over 40 years group 51.9 per cent had a record of previous convictions of one form or other, whereas in a similar number of unselected prisoners under 40 years of age 65.1 per cent showed previous criminal record, an excess of more than 13 per cent in the latter group. This difference, however, is reversed when we deal only with those prisoners who had previous penitentiary sentence. 32.5 per cent of our group fall in this category as against 24.6 per cent of those

under 40 years of age, a difference of 7.9 per cent. When the various age groups are studied for previous criminal record we find there is a definite increase in the proportion as one passes from the 'teen age through the 20's and into the 30's. Previous penitentiary sentences were found in only 4 per cent of those between 15 and 19. In the group between 20 and 29 there were 29.2 per cent, an increase of 25 per cent. This increase is even more marked in the age group between 30 and 39. Here 48.7 per cent had former penitentiary records. When this is compared with the next age group we find a marked drop of 16.2 per cent. On the basis of the increase which occurred in the first three of these groups there is an expectancy of approximately 63 per cent for

TABLE VI.
CRIME AND PENITENTIARY SENTENCE.

Crime	Under 40			40 and over		
	No.	Per cent	Total	No.	Per cent	Total
Robbery	28	23.9	117	16	53.3	30
Larceny	13	20.9	62	11	45.8	24
Burglary	15	21.4	70	21	56.9	37
Murder	5	29.4	17	9	16.3	55
Fraud	2	30.0	6	8	20.0	40
Sex	0	0.0	8	8	20.0	40
Miscellaneous	2	15.3	13	7	41.1	17

the over 40 age group. Therefore, only half as many of the over 40 group have previous penitentiary sentence as might be expected. In the record including all incarcerations and including all convictions this same tendency to increase up to 40 years of age with a sudden drop after 40 obtains.

The further significance of previous criminal record and the type of crime was next studied. (Table VI.) Here again a marked difference was noted. The relatively small number of prisoners in this group convicted of robbery, larceny and burglary showed a very high percentage of previous penitentiary sentence; whereas, the murder, fraud and sex groups show only half as great a frequency.

The possible significance of psychiatric diagnosis in relation to recidivism was included in our study. Approximately the same

number of persons without previous convictions as with previous convictions was found in each of the various psychiatric categories. The one exception is the group classified as being without gross personality fault. Five times as many of these showed no evidence of previous conviction as those who had penitentiary sentence.

In the course of the examinations of these prisoners a classification, psychiatric in nature, formed the basis for the segregation of the criminals. Prisoners were studied with a view to determining the branch of the penitentiary system best suited to meet their training and treatment needs.

Since this involved not only diagnosis but treatability as well, both factors enter into consideration. The Illinois Psychiatric Research Council has drawn up the following table for classification of prisoners:

- I. Psychosis.
- II. Intellectually defective:
 - A. Improvable—socially.
 - B. With continuing criminal tendencies.
- III. Those not intellectually defective nor psychotic:
 - A. Improvable:
 - 1. Over 21 years of age.
 - 2. Under 21 years of age.
 - B. Questionably improvable:
 - 1. Over 21 years of age.
 - 2. Under 21 years of age.
 - C. Not improvable:
 - 1. Capable of satisfactory institutional adjustment.
 - 2. In need of psychiatric care and supervision.

When this group is studied in relation to this plan we find that 4.2 per cent fall in the psychotic group, 14.9 in the intellectually defective group, 56.0 in the improvable group and 24.9 in the unimprovable group.

SUMMARY AND CONCLUSIONS.

It seems fairly evident from this study that in the main persons who commit crime after 40 years of age represent a distinct group. They tend to commit crimes of violence, such as murder and sex crimes on the one hand, and fraud on the other. In the first two they tend to be relatively free from early records of delinquency and crime. In the second group their criminal behavior tends to

be a continuation of a pattern established at an earlier age. That smaller proportion whose crime is for gain tend to show extensive earlier criminal record. This older group includes many men coming from foreign countries whose ability to adapt themselves may be expressed in the violence of their behavior. This group is distinguished by the general lowering of intelligence, although this may be in large part determined by the method by which they are measured. Among them are so many persons of foreign birth and training that their ability to respond to tests developed for use with American citizens may account for the generally lowered response. They show a greater limitation of educational achievement. Perhaps this is due to the fact that coming from an older group their opportunities were more limited than for the younger criminal of to-day.

The more significant difference, however, is apparently related to the early history of delinquency and crime. The fact that there is such a marked drop in previous penitentiary sentence after the 30-year group must be considered as of particular significance. To conclude from this, however, that crime ends with the beginning of the second period of life cannot in this limited study be definitely shown. There is, however, fairly definite evidence that factors within the individual, perhaps constitutional in character, do determine not only the distinctive character of the criminal after 40 but also the cessation of the criminal activities about 40 years of age.

EFFECT OF VITAMINS A AND D AND MINERAL ADMINISTRATION IN DEMENTIA PRÆCOX.*

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This is an empirical therapeutic and biochemical investigation with vitamins in a group of dementia præcox patients checked with control studies. The investigation was carried out with vitamins A and D. Not being able to obtain the pure crystalline vitamin D of Windaus nor Euler's carotene, the material from which vitamin A is produced in the organism, we used viosterol in halibut oil which contains both these vitamins. The preparation used was biologically standardized, each gram containing 32,000 U. S. P. units vitamin A and 3333 Steenbock units vitamin D. Vitamin D, having mobilizing action on calcium and phosphorus, we have added to the diet of the treated patients a mineral mixture in tablet form containing $7\frac{1}{2}$ gr. (0.486) of calcium and phosphorus.

The group consists of 15 female dementia præcox patients and an equal number of patients observed as controls and 17 male patients with the same number of controls. The three main types, the paranoid, catatonic and hebephrenic, were represented in about equal proportions. Prior to the institution of the administration of the vitamins and the minerals, physical and mental examinations were made and specimens of blood and spinal fluid were taken under basal condition for the determination of total lipids, total cholesterol, cholesterol esters, free cholesterol, lecithin, proteins

* This investigation was suggested and made possible by Dr. R. P. Folsom, Superintendent, Hudson River State Hospital.

The biochemical analyses forming the basis of this paper were carried out in the laboratory of Professor Isador Rosen, with the conscientious aid of Dr. A. S. Rosen, of the Department of Dermatology and Syphilology, New York Post-Graduate Medical School and Hospital, Columbia University, New York.

We are indebted to Mead Johnson and Co., Evansville, Indiana, for donating a generous supply of viosterol and mineral mixture to carry on this work.

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and calcium in blood serum and of the total lipids and lecithin in the spinal fluid. The same procedure was carried out in the control cases. During the period of treatment a monthly checkup was made on the physical and mental condition while a checkup analysis of the spinal fluid and blood serum was made at the end of the course of treatment. A similar procedure including the biochemical determinations was carried out on the control group. All efforts were made not to create any special atmosphere in order to avoid possible psychologic effect that might have influenced the results of therapy.

The ages of the treated female patients ranged from 20 to 47 with an average of $33\frac{1}{2}$ years. There were five catatonic, five hebephrenic and five paranoid patients. One patient was admitted in 1910, seven patients were admitted in the years between 1920 and 1930 and the remaining seven since 1930. With the exception of one patient the entire group was treated for a period of six months. The patients were given 5 to 15 drops of viosterol three times daily and three mineral tablets a day.

In the control group the three main types of dementia præcox were equally represented. The ages ranged from 19 to 46, and the average age was $32\frac{1}{2}$ years.

The group of male dementia præcox cases consisted of 17 patients treated and 17 controls. In the treated group there were eight catatonic, five hebephrenic and four paranoid patients; their ages ranged from 18 to 39 with an average of 26 years. Twelve patients were treated five months, four six months and one two months. Four patients of this group were admitted between the period of 1920 and 1930 and the remaining since 1930. The control group consisted of an equal number of patients with eight catatonic, six hebephrenic and three paranoid cases with ages ranging from 19 to 55 and with an average age of 30 years and 9 months. Twelve of these patients were observed five months and five six months.

The analytical procedures used in the determination of the lipids, proteins and calcium were those adopted by Rosen, Krasnow and Lyons.^{1, 2, 3}

RESULTS.

The averages vary only slightly from the normal—the greatest differences occurring in the values for total lipids, cholesterol,

cholesterol esters, lecithin and calcium as may be noted in Table I. After administration of viosterol and mineral tablets to females there was an increase in total lipids and lecithin for Series A. Also, from the relationships in Table II, a distinct rise in the percentage of female cases with high serum total lipids, albumen and globulin seems to have been effected by the ingestion of these substances. However, any significance which may be attached to such a finding is precluded by a glance at the corresponding figures in Table III for Series B. Exactly similar changes are listed. Equally interesting is the increase in average total lipid content at the end of the observation period for this set of cases.

These are not the findings for the males. Instead of a distinct rise in total lipids and lecithin there appeared a tendency to decreased amounts of these constituents in Series A as well as in Series B (Tables I, II and III).

Table IV shows the results of analyses for cholesterol and lecithin in the spinal fluid and gives further evidence of similarity for the two series. An investigation of the meaning of such changes would, no doubt, lead to very interesting findings.

The tendency for calcium values to fall above the normal average range, shown in Tables I, II and III, is noteworthy but the data to date do not warrant attempts at any definite explanation.

Clinically, of the 15 women patients one showed a temporary improvement; she left the hospital after four months of treatment, but had a relapse and was returned to the hospital a few months later (Table V). Another patient showed only a very slight improvement in her general behavior; she became more amenable to the ward routine without giving up her delusional ideas and without ceasing to hallucinate. The rest of the group failed to show any change in their mental condition during the six months of therapy and during the subsequent six months of further observation. There was no change in their physical condition, including the hematological findings, except for some variations in weight. Loss or gain of two or less pounds was not considered as a significant change. In seven cases a gain in weight was noted with an average of 10 pounds, the lowest being three pounds; in one instance a gain of 40 pounds was observed; this patient, however, was in good physical condition and weighed 167 pounds before he was submitted to the vitamin regimen. In another instance a

TABLE II.

DISTRIBUTION OF SERUM VALUES IN DEMENTIA PRÆCOX WITH REFERENCE TO THE NORMAL RANGE BASED ON RESULTS OF SERUM ANALYSES BEFORE AND AFTER THE ADMINISTRATION OF VIOSTEROL AND MINERAL TABLETS.

Analyses, Series A.	Treat.	Female.				Male.			
		Percentage of determinations showing values.			No. of determina- tions.	Percentage of determinations showing values.			No. of determina- tions.
		Below normal average range.	Within normal average range.	Above normal average range.		Below normal average range.	Within normal average range.	Above normal average range.	
Total lipids	Before After	14 23	57 15	29 62	14 13	19 40	56 40	25 20	16 15
Cholest. total	Before After	36 39	21 23	43 39	14 13	56 53	25 20	19 27	16 15
Esters	Before After	21 39	50 31	29 31	14 13	50 20	25 33	25 47	16 15
Free amount	Before After	29 31	50 46	21 23	14 13	44 20	31 53	25 27	16 15
Per cent of total	Before After	36 23	36 54	29 23	14 13	38 20	31 33	31 47	16 15
Lecithin	Before After	43 23	29 46	29 31	14 13	56 67	31 20	13 13	16 15
Albumin	Before After	43 15	43 54	14 31	14 13	19 7	50 47	31 47	16 15
Globulin	Before After	14 0	50 31	36 69	14 13	25 20	31 33	44 47	16 15
Calcium	Before After	7 0	29 39	64 62	14 13	6 13	19 33	78 53	16 15

TABLE III.

DISTRIBUTION OF SERUM VALUES IN DEMENTIA PRÆCOX WITH REFERENCE TO THE NORMAL RANGE BASED ON RESULTS OF SERUM ANALYSES CARRIED OUT AT THE BEGINNING AND END OF A DEFINITE OBSERVATION PERIOD.
NO ADMINISTRATION OF VIOSTEROL AND MINERAL TABLETS.

	Observa- tion.	Female.			Male.				
		No. of determina- tions.	Below normal average range.	Within normal average range.	Above normal average range.	No. of determina- tions.	Below normal average range.	Within normal average range.	Above normal average range.
Analyses, Series B.									
Total lipids	Beginning End	15 15	33 33	60 27	7 40	18 20	22 70	61 20	17 10
Cholest. total	Beginning End	15 15	47 47	20 20	33 33	18 20	39 50	44 20	17 30
Esters	Beginning End	15 15	40 40	33 47	27 13	18 20	39 35	44 40	17 25
Free amount	Beginning End	15 15	27 20	33 40	40 40	18 20	39 55	33 15	28 30
Per cent of total	Beginning End	15 15	26.6 20	26.6 33	46.6 47	18 20	33 40	28 25	39 35
Lecithin	Beginning End	15 15	33 33	47 40	20 27	18 20	56 55	33 40	11 5
Albumin	Beginning End	15 15	40 7	53 73	7 20	18 20	28 20	56 55	17 25
Globulin	Beginning End	15 15	6.6 6.6	46.6 26.6	46.6 66.6	18 20	28 15	33 45	39 40
Calcium	Beginning End	15 15	7 0	27 40	66 60	18 20	17 5	28 35	56 60

drop of three pounds was noted while the remaining five cases showed no particular change, if changes of two pounds in either direction are to be disregarded.

No change in mental or physical condition was noted in any of the women patients of the control group, they all are still inmates in the hospital at the time of this report. Three of the group showed a gain of 4 to 13 pounds, five showed a decrease from 5 to 15

TABLE IV.

SUMMARY OF RESULTS OF ANALYSES ON SPINAL FLUID IN
DEMENTIA PRÆCOX.

FEMALE.

Series A: Administration of Viosterol and Mineral Tablets.

Descr. of cases.	Number of determina- tions.	Total cholesterol.	Lecithin.
Before treat.	14	1.5 ± 0.4	0.64 ± 0.1
After treat.	13	1.8 ± 0.4	0.59 ± 0.1

Series B: Control on Time Interval.

Beginning of observation.....	15	1.7 ± 0.4	0.61 ± 0.1
End of observation.....	15	1.8 ± 0.6	0.54 ± 0.1

MALE.

Series A: Administration of Viosterol and Mineral Tablets.

Before treat.	16	2.0 ± 0.4	0.59 ± 0.2
After treat.	15	1.6 ± 0.3	0.55 ± 0.1

Series B: Control on Time Interval.

Beginning of observation.....	18	1.8 ± 0.5	0.54 ± 0.1
End of observation.....	20	1.6 ± 0.4	0.50 ± 0.1

pounds, and in seven no appreciable change in weight was noted at the end of the period of observation.

Comparing both groups of treated and control patients we can say that with the exception of a somewhat larger number of cases with an increase of weight under treatment and with the exception of a temporary improvement in one case and slight improvement in another case there was no appreciable difference in the condition of the patients in both groups at the end of six months of observation.

TABLE V.
DEMENTIA PRÆCOX (FEMALES).

Treated.						Controls.					
Age.	Adm.	Type.	Dur.	Remarks.	Age.	Adm.	Type.	Weight.			Remarks.
								Bef.	Aft.	Dur.	
1. 47	1910	Cat.	6 m.	No change	1. 33	1931	Cat.	143	143	6 m.	No change
2. 37	1921	Cat.	6 m.	No change	2. 33	1932	Cat.	102	90	6 m.	No change
3. 38	1926	Cat.	6 m.	No change	3. 25	1927	Cat.	135	130	6 m.	No change
4. 22	1933	Heb.	6 m.	No change	4. 19	1932	Heb.	111	112	6 m.	No change
5. 41	1929	Par.	6 m.	No change	5. 46	1926	Par.	136	136	6 m.	No change
6. 39	1922	Par.	6 m.	No change	6. 33	1930	Par.	112	107	6 m.	No change
7. 33	1926	Heb.	6 m.	No change	7. 40	1930	Heb.	124	132	6 m.	No change
8. 28	1931	Par.	6 m.	No change	8. 31	1928	Par.	96	100	6 m.	No change
9. 24	1933	Cat.	6 m.	Mild temp.	9. 40	1921	Cat.	94	107	6 m.	No change
10. 37	1930	Par.	6 m.	No change	10. 47	1919	Par.	150	151	6 m.	No change
11. 20	1932	Par.	4 m.	Temp. imp.	11. 28	1931	Par.	101	86	6 m.	No change
12. 45	1929	Heb.	6 m.	No change	12. 21	1929	Heb.	126	116	6 m.	No change
13. 45	1930	Heb.	6 m.	No change	13. 46	1926	Heb.	110	109	6 m.	No change
14. 25	1927	Heb.	6 m.	No change	14. 28	1929	Heb.	93	93	6 m.	No change
15. 24	1933	Cat.	6 m.	No change	15. 20	1932	Cat.	88	88	6 m.	No change

Of the male treated patients one has sufficiently improved after two months of therapy to leave the hospital (Table VI) ; he is a 25-year-old hebephrenic præcox. There was a slight improvement in the general behavior of another patient but not sufficient to warrant his discharge from the institution. None of the rest of the group showed any perceptible change in their mental condition. Six patients of this group showed a decrease in weight from 3 to 14 pounds, three patients gained from three to four pounds, while the remaining eight patients showed practically no change except for slight variations of one to two pounds in either direction in some instances.

None of the control patients showed any change in their mental condition at the end of the period of observation. Four patients lost weight at the end of the period, three three pounds each, while one lost 12 pounds. Six patients showed a gain from 3 to 19 pounds, and the remaining seven showed no marked change at the end of five and six months of observation. If we compare the results of the treated group with that of the control group we see that there were twice as many patients in the control group with an increase in weight as compared with the group of treated patients and practically an equal number of patients showing no change in weight in either group.

SUMMARY OF CONCLUSIONS.

Fifteen women and 17 men dementia præcox patients were treated with vitamins A and D and a mineral mixture for a period of several months. An equal number of control cases were observed for approximately the same length of time. Biochemical determinations were made in all groups at the beginning and at the end of observation.

One male patient has sufficiently improved to leave the hospital, a female patient showed only a temporary improvement. Two other patients, one in each group, have improved slightly but not enough to warrant their discharge. It is very questionable whether the vitamins were the responsible factors for the observed improvement ; the psychologic element cannot be disregarded. The remaining treated patients failed to show any change in their mental condition and are still in the hospital. No change was noted in any of the patients of the control groups.

There was a higher incidence of gain in weight among the treated women patients as compared to that among the untreated patients. In the male group, however, the percentage of gain in weight was higher among the untreated control patients. The routine blood counts showed no variation of importance in any of the groups.

No definite changes in the biochemistry of total lipids, total cholesterol, cholesterol esters, free cholesterol, lecithin, albumen, globulin and calcium of the serum and of the total cholesterol and lecithin of the spinal fluid have taken place as a result of the administration of viosterol and mineral tablets.

There appears to be a tendency to increased serum calcium, probably due to the progress of the disease.

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PSYCHIATRIC STUDIES IN MEDICAL EDUCATION.

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The study of medicine subjects the student to many stresses. The effect on the physical health has been studied from various angles. At the University of Pennsylvania Opie and his co-workers have made important contributions from the point of view of tuberculosis.^{1, 2} Dean William Pepper presented a summary of these findings to the Association of American Medical Colleges.³ Briefly, it was found that positive tuberculin reactions increased from 84.8 per cent amongst first year medical students to 98.2 per cent in fourth year students. McPhedran reported that the incidence of apical lesions increased from 4.1 per cent in the first year to 20.5 per cent in the fourth. These studies called especial attention to the importance of student health examinations. They stimulated health examinations amongst students. They had not only a value from the point of view of personal hygiene and health, but they had also an educational value. Students who took the examinations learned more about tuberculosis and the value of routine health examinations.

But the study of medicine is not only a strain on the physical health of the individual. It is also a distinct strain on the mental health of the student. The effect on the mental health or personality of the individual is perhaps more important than on the physical. There is probably no professional preparation which is more rigor-

¹ Hetherington, H. W., McPhedran, F. M., Landis, H. R. M., and Opie, E. L.: Tuberculosis in medical and college students. *Arch. Int. Med.*, 48: 734 (Nov.), 1931.

² McPhedran, F. M.: Incidence of tuberculosis in medical students. Twenty-fourth report of the Henry Phipps Institute, 1932-33.

³ Pepper, W.: Incidence of tuberculosis among medical students. *J. Assoc. Amer. Med. Coll.*, 7:5-11 (Jan.), 1932.

ous in its demands. The strains are not only physical, but mental, emotional and social. There is not only the intellectual requirement of learning a vast number of facts. There is the continuous application and rush which leads many to neglect their physical health. The wholesome effect of hobbies and the more usual methods of relaxation and diversion are frequently neglected by the push of work. But in the study of medicine the student meets, repeatedly and prematurely, compared with students in other professions, the great crises of life. And he meets them in concentrated doses. Suffering, sickness, death are his daily environment. Birth, death, hopelessness he sees frequently. Misery, poverty, tragedy are frequent contacts. Courage and weakness, hope and despair, love and hate, he meets in stark forms. No professional training brings its students so young into such intimate contact with heroism and cowardice, wisdom and stupidity, the depths and exaltations of life, as does the study of medicine. Religion, ideals, mores are assaulted and tested. Dissident ethics are encountered daily. Hence medicine is not only a strain on the physical health, but a tremendous strain on the forces making for the stability of the personality.

This paper is the introductory one of a series. The purpose of our studies has been to observe and record the effect of the study of medicine on the personality and mental health of the medical student. What are the strains? What are the most usual reactions? Do the stresses that must be met arouse neurotic responses in only a few unstable students or are neurotic reactions found generally at some time or other amongst the majority? What happens to neurotic tendencies once aroused—do they tend to persist and become fixed as neuroses, or do they disappear? Does the study of medicine create them or only exaggerate them? Are untoward reactions favorably or unfavorably influenced by the experiences the medical student must go through? Does the study of medicine make for stability or instability? Does the type of instruction or the attitude of the instructor have any significant effect on the student's mental and emotional health? Is medical education geared to help the student or hinder him as regards his mental health? What is the picture of the medical student as regards his mental health and how does it change during the four years? Is there a mental hygiene problem of medical students? These are some of the questions that naturally occur to anyone in considering this

subject. These questions are our problem. Naturally then our first step was to find a means of obtaining observations or data on the mental health or personality of the students.

This first paper is a discussion of our plan of study and technique. The methodology of such an investigation is very important. There are objections often raised to the methods of obtaining psychiatric observations. The paper presents in some detail the methods employed in making our observations and the care with which we have drawn conclusions. As such, it is chiefly a discussion of methodology. The papers to follow will present a statistical statement of our observations and the conclusions we think may be drawn from them.

The method of personal interview was rejected for several reasons. In the first place, it was not thought the student would express himself so frankly in a personal interview with an instructor as he would if his remarks were made anonymously. This would afford freedom, absence of restraint and no chance of anything being held against him for his opinions and reactions. Secondly, the time involved and the difficulty of making a possible schedule of interviews ruled it out. Finally, it seemed more desirable and objective for several psychiatrists to go over the observations at once and give their combined impression, rather than take that of any one psychiatrist. This we thought lent more objectivity to our observations. The questionnaire method of obtaining information was therefore adopted. In a succeeding section the reliability of this method will be discussed.

Francis Galton was one of the first to use the questionnaire method. In one of his books ⁴ Galton appends a list of "Questions on Visualizing and Other Allied Faculties." Earlier in the same work (page 84) he comments on the difficulty of framing questions and gives a number of requirements for a satisfactory questionnaire. He indicates four points that should be met. First, the questions should be such that they can be quickly and clearly understood. Second, they should admit of easy reply. Third, of course they must cover the ground of the inquiry, be sufficiently extensive. Finally, he says that they should tempt the subjects to write freely, elaborate, and make fuller explanation of their replies.

⁴ Galton, F.: *Inquiries into human faculty*, p. 378, 1883.

It seems worth while to indicate briefly how the questions were formulated. The contents of a number of well-known questionnaires were studied. Among these were Woodworth's Neurotic Inventory,⁵ Thurstone's Personality Schedule⁶ (which has been found to be a reliable index of neurotic tendencies), Bernreuter's Personality Inventory,⁷ and Wells' Study of Personality Traits.⁸ Then 12 experienced psychiatrists and four recent graduates of medical schools were told the problem and asked to formulate questions that they thought most relevant and helpful. No suggestions were given as to the type or comprehensiveness of the questions desired. Each physician was left free to formulate the questions which in his judgment would be most significant and likely to discover neurotic trends.

From each physician was received from 10 to 20 questions. Approximately 250 questions were then available from which to choose a satisfactory and reasonable number. Several of us then grouped all the questions according to a modification of Amsden's scheme for personality study.⁹ Four of us then reviewed all the questions and selected those which seemed significant for our problem. Finally a list of 75 questions was determined upon as being reasonably satisfactory. There was some duplication of questions in different phraseology to check up a student's consistency, conscientiousness and care with which he answered the questions. This was helpful too in case an individual missed a question or answered it hastily. Fortunately as it turned out there were few questions missed and there was an internal consistency in the overwhelming majority of the cases, that made the picture of a given personality's problems and reactions very clear. As an example of how one question checked up or supplemented another we might cite the following questions:

No. 4. How is your physical health? How is your physical condition?

No. 9. Since studying medicine have you developed any persistent physical symptoms, *e.g.*, pain, palpitation, indigestion, etc.?

⁵ Published by C. H. Stoelting and Co., Chicago, Ill.

⁶ Thurstone, L. L., and Thurstone, T. G.: Personality schedule, Published by the University of Chicago Press.

⁷ Bernreuter, R. G.: The personality inventory, Stanford University Press.

⁸ Wells, F. L.: Report on a questionnaire study of personality traits with a college graduate group. *Mental Hygiene*, 9 (Jan.), 1925.

⁹ Amsden, G. D.: A guide to the descriptive study of the personality. The Bloomingdale Hospital Press, White Plains, N. Y.

No. 47. Has anxiety about your own health been aroused by your study of disease? Has fear of infection or contagion worried you, in dissection, pathology laboratory, or clinics?

The questions were very comprehensive. They related to all aspects of the student's life. As we were arranging the questions, they were grouped under four chief headings, viz., somatic and physical, intellectual, emotional and social. It was convenient to have such a grouping, because when we made summaries in reading over the answers, we could fit them into a rather simple scheme for consideration and analysis. All questions relating to one subject were not arranged immediately following one another, in order that again we might check up hastiness, carelessness, or inconsistency. Under the heading of social reactions in our preparation of the questions and in our summaries we included such things as the following: Type of personality, whether extravert or introvert; questions relating to maturity, ideas of sex, marriage and parenthood, or homosexuality; vocational adjustment; plan of life, ambition, economic considerations; satisfaction as to education or the reverse; opportunities, family stresses, attitudes toward parental training and religious and ethical ideas and practices. . . . It is remarkable that out of the 75 questions only one, no. 33, seemed to be the least revealing:

No. 33. Are you scrupulous, neat, meticulous, punctual, reserved, spontaneous, dominating, submissive, indifferent, careless, inaccurate, impulsive, lazy? Underline the traits which characterize you.

This question, which is one of the most specific, and which required only a dash to indicate a characteristic that applied to the student, nevertheless was consistently the most unsatisfactory question. It was invariably answered but it helped least of all in obtaining a picture of a given personality. This study is different from many questionnaires where underlining or checking is the chief form of response. In this questionnaire, in the great majority of questions, definite written replies were necessary—and they were obtained.

The reliability and validity of the results obtained by these questionnaires surpassed by far our expectations. There were only three papers in the senior class of 117 that were unsatisfactory for one reason or another. Only three were not sufficiently accurate and detailed to give us a clear cut picture of the personality or the prob-

lems of that particular student. None was facetious. The percentage return was good, therefore. Jordan¹⁰ says that if 75 per cent of the questions are answered or returned in a questionnaire the results may be considered reliable if they are internally consistent. Reviewed from this standard, our results are very reliable. A number of things contributed to this. It was not merely the comprehensiveness of the questions, their overlapping, and their clearness. It was not merely a mechanical application of a test. The method of approach, presentation and appeal we believe were of the utmost importance. This cannot be emphasized too strongly. The appeal was made on a personal and scientific basis. The success of the effort must be laid in great part to this tactful and personal appeal. Since we know of other questionnaires that have failed completely, it seems worth while to present briefly our plan of approach to the students. One class was given the questionnaire the day before the other three classes. This seemed to make little difference, although we would have preferred that they all came the same day.

The week before the questionnaires were to be given, the Head of the Department appeared before each class for a few minutes. He told them the following meeting would be devoted to a psychiatric project, that he hoped as many as possible would be present that day, and that they would cooperate in the undertaking. Several days before the questionnaires were to be given, remarks reached some of us that some of the students were going to take the undertaking facetiously. The Head of the Department wrote a letter to the president of each class, who read it to his groups. In this letter an appeal was made for the students to cooperate in a scientific investigation of the effects of the study of medicine on the personality.

At the beginning of the period (the Dean kindly allowed us three hours for each class) a member of the Department of Psychiatry addressed remarks to the class before the questionnaires were distributed. In these remarks a personal appeal was made for cooperation and sincerity of replies. It was pointed out that psychiatry is chiefly advanced by what people tell us of their thoughts and feelings. It was indicated that in dealing with normal

¹⁰ Jordan, A. M.: Educational psychology, New York, 1933.

individuals under vocational strains, data could be obtained of scientific value, and perhaps also of value in thinking of problems connected with the medical curriculum. We emphasized that the study was absolutely anonymous. The students were requested to make their answers with a scientific conscience and not to answer at all rather than give untruthful replies.

The time allowed for answering the questionnaire was three hours. The reaction of a number of members of the faculty to answering 75 questions was rather overwhelming. They believed it too great an undertaking, and that it would require so much time that everyone would become tired, bored, and careless, so that the results would be unsatisfactory. Fortunately, about 10 days before the questionnaire was given, it was tested out on a medical student from another school. He answered all questions conscientiously and fully, in 1 hour and 20 minutes. He did not feel the questionnaire was too long, even though his answers were very detailed, and showed evidence of great emotional difficulty. It was known by one of us that he suffered from a marked schizophrenic episode. Another of us read his paper and from the analysis of his replies alone the estimate of his condition and personality tallied perfectly with the psychiatric examination of the other. This was our first direct evidence of the reliability and satisfactoriness of the questions. In the senior class, on which this first section of the report is based, the majority of the students required an hour or more, and less than two hours. The following table shows the time required by the senior students to answer the questionnaire:

Time groups.	Reliable.	Unsatisfactory.	Sketchy.
I (0'-40').....	5	..	1
II (40'-60').....	50	2	1
III (60'-90').....	44	1	6
IV (90'-120').....	7	..	..

The questionnaire method is open to many criticisms. As stated above, its origin is probably traceable to Francis Galton. Through its use G. Stanley Hall collected much valuable information for education. Leuba has used it extensively in his studies on religion. It is one of the recognized procedures, but it has many pitfalls.¹¹ Ruckmick points out the following weaknesses of the method.

¹¹ Ruckmick, C. A.: The uses and abuses of the questionnaire procedure. *Jour. of Applied Psych.*, 14: 32, 1930.

The questionnaire method has a tendency to stress explicit and categorical answers. The expert, he says, refuses to be categorical while immaturity tends to be explicit. In this study it seems to us the answers show a wholesome balance between concise, explicit answers and the " fuller explanation " and elaboration Galton seeks. In the great majority of answers in this study they are elaborated sufficiently to be considered very satisfactory. Ruckmick of course points out that questions can contain such crude suggestions that they lead to biased answers. We believe this does not apply in our questionnaire. He points out that often there is an unsystematic type of data obtained by the questionnaire. This objection is eliminated in our case by the careful, systematic grouping of the questions before they were distributed in the questionnaire. Our data summed up is not unsystematic. The uncertain nature of the interpretation of results is an important criticism, but this is not limited to the questionnaire method. The interpretation of all data offers chances for error and misrepresentation. In our study we have tried to obviate this objection by having three psychiatrists interpret each separate paper. An interpretation was recorded only when all agreed. We have not tried to force diagnosis or impressions of neuroticism. Where there was question of doubt we have always leaned toward the side of normal classification. Ruckmick also speaks of the false glamor of statistical presentation: " However highly statistical treatment may be rated, the results are often not much better than their origin." Certainly in this study the origin was felt to be genuine and reliable in the overwhelming majority of replies. On this point we lay our greatest stress as a point of departure for our study. We believe the replies were formed on a solid basis of honesty. " The seriousness with which the replies are made varies greatly even to the vanishing point of lack of good faith." ¹² The frankness of the replies, it seems to us, establishes the faith without which such a study would be useless. Ruckmick continues, " The effect of the demand for a signature to establish good faith must in no case be overlooked." We disagree with this statement heartily. If signatures had been attached to many of our questionnaires, it is certain we would not have received the frankness of replies which forms one of the indisputable strengths of our study. If the students had

¹² Ruckmick: *Op. cit.*

known their names and individualities personally would have been known and opened to scrutiny, they would have been much more reserved.

If many questions are left unelaborated, it invalidates the method. Fortunately, this did not occur for us. The same applies to replies left blank. Relatively, they were very few. There was little evidence of the students feeling aggrieved at the questions asked, and refusing to reply. In addition to the information we have obtained and the conclusions we have reached, we believe our study is a contribution to the methodology of psychiatric investigation by the questionnaire.

Rugg¹³ emphasizes the importance of showing the respondents the pertinency of the inquiry. We have indicated how this was done in our appeal to the students before being given the questionnaire. Rugg suggests that the introductory paragraph be somewhat explanatory so that the respondents will know what one is doing and also arouse interest. Question number one did just this.

Waddle¹⁴ reviews very clearly the value and the objections to questionnaire methods. The value he says depends on,

1. The nature of the topic investigated
2. The care and skill of the formulation of the questions
3. The representative character of the group questioned
4. The honesty and conscientiousness of the respondents
5. The scientific ability of the investigators interpreting the material
6. The use made of the deductions.

We believe our study fulfills reasonably well all of these qualifications.

Further points supporting the reliability of our study follow. The duplication of questions in different terminology was a check on reliability. There was a scattering of questions so that they did not appear too rigidly divided into classes. For example, all social questions were not all grouped together: some appeared under sex or anxiety or physical symptoms. Many students wanted questionnaires to keep, expressed interest in the study and satisfaction with the entire procedure. A number of students have

¹³ Rugg, H. O.: Statistical methods applied to education, 1917.

¹⁴ Waddle, C. W.: An introduction to child psychology, 1918.

asked for personal conferences with one of the psychiatrists following the answering of the questionnaire. We have encountered students now serving internships who had taken the questionnaire and asked them specifically as to their opinions as to the reliability of the answers the students gave. The invariable reply of these men one year later, as the reply of the students the same year, was that the answers were given *bona fide*. We have inquired of the same group whether they heard any unfavorable comments and their answers were consistently "No." During the actual answering of the questions and immediately thereafter we had no humorous comments, no joking nor kidding, in fact, nothing which would indicate that the whole affair had been taken in any way other than with the appropriate seriousness. The attitude of the groups was dignified and they seemed to have a feeling of responsibility in their attitude toward the study.

The reliability was further confirmed by the fact that of all the papers returned only three were unsatisfactory and not one was facetious. There was remarkable correspondence and faithfulness between the replies in the questionnaire and the picture as painted in the actual case study of several students who later consulted some of us personally, yet who at the time of the questionnaire had not thought of so doing. The consultation in these several cases validated the truthfulness of the questionnaire picture of the personality.* We firmly believe that any impartial observer of experience, going over the replies, would feel satisfied and convinced of the truthfulness of the picture obtained in the great proportion of cases. There is usually an inner consistency and genuineness of impression.

But we come back to the question of frankness and truthfulness as the basis of our claim for reliability and validity. In substantiation, let us give some actual quotations:

Student 8 is very frank with regard to questions on sex. "Has your sex desire been stimulated or decreased by the study of medicine?" Answer: "No particular change in the desire. Have found it easier to satisfy." "How have you dealt with the problem?"

* Several students who consulted us were asked if they had any objection to helping us in the study of the questionnaire by trying to find their own papers and letting us compare them with what they had told us in our psychiatric interview. They willingly complied with these requests.

"Naturally, though not excessively." "Has fear of venereal infection changed your sex life?" "I think so, in that I am a bit more careful 'where I put it' since professor X shouted 'lues, pues, lues' to us."

Student 13 in response to the question why he had studied medicine said, "My grandfather was an M. D., my father was an M. D. I was an only child. It would have been immoral for me not to have been an M. D."

Student 15 says that since studying medicine he has felt differently about his childhood, childhood training and parents. "Being born of foreign-born parents and living all my life in the slums of a large city, there are still remaining in me certain traits which I would like to lose."

Another student says his sex desire has been stimulated by the study of medicine. "How have you dealt with the problem?" "I have satisfied my desires." "Has fear of venereal infection changed your sex life?" "No. 'The woman is above reproach.'"

Student 17 is frank in discussing his self-confidence in medical school. "More self-confident in a way. In high school I was a 'big shot.' In college I took a big 'fall' (luckily). At present I realize that if you work hard and get an even break you have a chance to get along."

Student 31 discusses his symptoms freely in response to question one. "Several periods of depression. The first at the age of 14, then worrying about illness of a parent. Most recent at age of 21, worrying about an ill sibling. Periods of emotional numbness (lack of interest in anything) follow periods of depression and also periods of worry such as the attempt to get a satisfactory internship. Physical symptoms include feeling of constriction in abdomen, and dyspnoea. Mental symptoms include inability to think clearly, inability to concentrate."

Student 33 is frank. He raises some points in the mental hygiene of childhood. "Have you been more conscious of either physical or mental defects since your study of medicine?" "Yes." "Explain." "Self-consciousness. Class room demands of the individual, participation. Discussion constantly forces me to focus my attention on myself." "Since studying medicine do you feel differently about your own childhood, your childhood training, or your parents?" "Yes. I am sure that the domineering attitude of

my father has contributed much to my shyness." With regard to sex, he says, "I abstain from sexual contacts because of family training. Sexual life in my case means married life. . . ." With regard to religion he replies, "I am a church goer. The only consistent attitude to me is one of modified fundamentalism. . . ." "Have your thoughts concerning death been modified by your study of medicine?" "Death has lost its horrors but not its sorrows."

A frank description of a neurotic episode is from student 44: "During pathology I had tonsillitis for a week. Thought I had palpitation and afterward thought I could hear a murmur. Had dyspnoea on exertion and thought finger nails were cyanotic. An older student took me to a doctor who said there was nothing wrong. All symptoms left over night."

Student 50. "Has the study of medicine influenced you to think certain thoughts that constantly distract you?" "Yes. It has been of value in helping me to break away from masturbation. Have consulted G. U. men about this habit. Probably would not have had the nerve to go to anyone about this problem unless medicine had removed some of its horrors. . . ." "Have lost a hypercritical attitude to others. . . . Have come to feel more self-confident." "Most pleasant medical experience?" "Six weeks as junior interne in maternity hospital." "Most unpleasant?" "A patient of mine dying of puerperal sepsis."

Student 60 has the following reactions: "Aloneness—with unpredictable periods of tension and tears. Headache, throbbing, afternoons, two-three days per week. Sensitiveness—sometimes palpitation and nausea. Fear—that emotional instability may interfere with the routine of an internship. . . ." "Sex desire?" "Increased. Attempted sublimation, group living, out of doors, rather than parlor dates, social contacts through religious groups, sports." "Religiously more-tolerant, less dogmatic. Spiritual conceptions entirely in harmony with scientific knowledge." "First reaction to chronic hopeless disease?" "Remembered what an old doctor told me: 'Nine-tenths of what we do in medicine is to help people bear things that no one can do anything about.'"

Student 61 had the following neurotic reactions: "Persistent thought that I had adeno carcinoma of the rectum in second year. Spasm of esophagus upon swallowing led to disturbing and persistent worry over cancer of esophagus. Perennial sinusitis and its relation to bronchiectasis is an annual fear."

Student 57 was frank about previous illness. "Have had two 'nervous breakdowns.' . . . I had marked insomnia, marked fatigue, anorexia, diarrhea, fears. . . . Faintness during an operation. . . . Have a much clearer understanding of my childhood compulsions, shyness, and adolescent problems. . . . Religion means more to me. . . . Idea of immortality of the soul seems increasingly certain."

We have quoted examples in detail to show that the frankness extends not only to matters of sex and personal problems, to physical health and neurotic symptoms, but also to social relationships, ideals, and the personal needs (or distaste) for religion. There is no question in the minds of those of us who have gone over these questionnaires in detail, that the greatest number of students answered these questions honestly and with a scientific conscience.

METHOD OF ANALYSING THE QUESTIONNAIRES.

The analytic work was done by three psychiatrists, *working together*, at the same time, on the same questions, charts, tables, summaries and impressions. Nothing was checked, recorded or summarized that we did not all three agree upon. Nothing was left to the individual opinion of one psychiatrist. *Each answer to each question of each student was checked by the three of us.* In being thus careful, and requiring unanimity of observation and deduction, we tried to arrive at objectivity. It is probably a conservative estimate to say that each psychiatrist gave two and a half to three hours to the study and analysis of each paper. This was independent of the time required in statistical work, making tables, or writing the paper. Thus, literally from seven to nine hours were given to each student's paper. This is an indication of the care with which we worked.

There were five steps to the consideration of each paper. These steps will be briefly reviewed.

1. The answers on the *questionnaire* were read and checked one by one by three psychiatrists together. (A variation to this which saved time was for one psychiatrist alone to go over each paper and write a summary which was read to the three psychiatrists before the whole questionnaire of that individual was reviewed in its

TABLE OF CLASSIFIED DATA

No. of student.	Reliability.	Clear, detailed, superficial.	Personality.				
			Extra.	Intro.	Normal.	Neurotic.	Psychotic.
84	+	Clear. Not elaborate.	Ext.	—	N	—	—

INFLUENCE OF MEDICINE.

On personality.			On physical state		
Neurotic.	Psychotic.	Normal.	Normal efficiency.	Somatic state.	Remarks.
Slight.	—	—	0	Good.	Less exercise. Eats irregularly. Drinking reduced. Smoking increased.

Somatic physical symptoms.		Intellectual.	Emotional difficulty.			
Possession.	Influence.		Possession.	Influence.	Created.	Remarks.
—	Indigestion before final exams.	Work is easy. Fair preparation. Standing higher—middle third. Enthusiastic. Disliked course X. Going into G. P.	Indigestion after meal.	Symptoms aggravated.	Vomiting occasionally previous to finals. Fear of cancer. Depressed by chronic and hopeless disease.	Day dreams of future practice and hypothetical cases. No alcohol. Hobbies: golf, swimming, reading, bridge. Engaged. Has faith. Worrisome. Feelings of guilt for short time.

SOCIAL REACTIONS.

Normal.	Abnormal.	Affected favorably.	Unfavorably.	Create maladjustments.	Remarks.
√	—	Life means more. Viewpoint broader.	Feelings of inferiority.	—	Likes company of both men and women.

entirety again and the impression written. This method was used for approximately half the cases.)

2. The answers were checked on a large statistical chart. Interesting items were asterisked for comment.

3. Answers were then rearranged in a *table* according to the original classification of data desired—physical, intellectual, emotional, social being the headings. It will be remembered that the questions were originally scattered in the questionnaire so that all questions relating to physical health and neurotic symptoms, for example, did not follow one another. So in analyzing the papers, the material was arranged systematically in a large table, in order to get data grouped together. An example of this table follows. It seems elaborate, but it was a great help in obtaining a bird's eye view of the various reactions of each student.

4. After a complete review of the original paper and a consideration of the table of classified data, the following summary was made by the three psychiatrists:

Summary: Frank normal extravert. Paper not elaborate. Student developed neurotic symptoms after admission to medical school. More marked especially with final exams. Caused vomiting at times. Wants to be general practitioner. Medical school brought to light some inferiorities, though in general he has been helped by medical studies. Middle third of class. *Impression*—typical extravert personality. Normal.

5. A final *impression* was made and the paper was classified in a certain group, that is, *normal* or *neurotic*.

STANDARDS OF CLASSIFICATION.

The responses in the questionnaires fall into three broad, readily recognizable groups. They are the *Normal*, the *Neurotic*, the *Pre-psychotic*. It seemed to us possible to separate the neurotic group into three subdivisions—the *mildly* neurotic, the *definitely* neurotic, and the *markedly* neurotic.

(I) In the normal group we allowed a moderate amount of sensitivity and slight instability. There could be self consciousness, for example, occasional palpitation, indigestion, headache, or slight anxiety, which had no persistence and which was of little significance fundamentally.

(II) Group two was thought of as being mildly neurotic. Or usually there was the story of a definite *episodic neurotic reaction* some time during the study of medicine. But this had not lasted

long, had been overcome, or successfully dealt with. At some time in the medical course this group might have been called "mildly unstable."

(III) Group three included those *definitely neurotic*. There was a definite, persistent instability. This was usually not overcome. It was a burden or handicap the individual had to bear. But we felt in this group he could carry the load or make the grade in the future. He was handicapped, but we felt reasonably sure he could carry it and thought it would not greatly interfere with his professional accomplishment or social adaptation.

(IV) Group four was the *markedly neurotic* group. Here there were neurotic symptoms usually in more than one system of the body or there were marked psychological neurotic manifestations. In this group the student was not only definitely handicapped, but we felt uncertain of his ability to carry the load, *we felt insecure about his future*. We had the impression that his instability would interfere a great deal with his life adjustment and professional accomplishment. The uncertainty of prognosis distinguishes this group from group III.

(V) In Group five, the instability was most marked, or there was a history of serious instability. The personality had been seriously disorganized, and the prognosis was precarious. There was a severe instability. The following table shows our standards of classification:

STANDARDS OF CLASSIFICATION.

Group.	Degree of instability (neuroticism).	Frequency.	Prognosis.
I.	Normal. Slight.	Occasional.	Good.
II.	Mild.	Episodic. Temporary interference.	Good.
III.	Definite.	Fairly constant burden.	Good. We feel certain handicap can be carried.
IV.	Marked.	Permanent handicap.	Doubtful. We feel uncertain whether handicap can be carried.
V.	Serious.	History of a severe attack (e. g., true depression) or Presence of permanent severe instability.	Precarious.

Let us now give a few illustrations of each group. It will be seen that we have tried on every occasion of doubt to lean toward the normal side in all evaluations of normalcy or neuroticism. It is possible that because of a frequent implication that psychiatrists always look for abnormalities, we have leaned backwards in our effort to avoid such errors.

The following summary is an example of a paper taken as *normal*, that is, Group I:

99. Normal extravert. Clear, reliable. Doctor's son. Since medical school had occasional, sudden, severe pain in chest. Slight insomnia and irritability. Mild fears in bacteriology and of cut on hand after delivery of luetic woman. Mild worries about F. H. of cardio-renal disease and cancer. Gynecological exams in very young girls were distasteful. Disliked to see patients suffer. Feels humanising influence of studying medicine. Has some feelings of inferiority socially and as to medical knowledge. No change in religion. Feels need for it. Fears death less keenly. Impression: Very mild neurotic reactions aroused in normal personality. Medicine helped to stabilize his personality.

Following is an example of *Group II* or *mildly* or *episodically unstable* or *neurotic*:

65. Introvert. Very clear, frank, detailed paper. Has good insight and evaluates questions remarkably well. Neurotic symptoms developed after study of medicine, but has learned to control them. Worried about unsettled internship. Greater instability. Drinks more frequently but less in amount. Is idealistic. Stresses physical well being. Feels that medicine lessened sociability. Studied medicine to protect self from tendency to introspection. Looks upon motherhood less idealistically and feels disillusioned about women. In love and has sex companionship with married woman. Since studying medicine, has broken off engagement. Developed syphilophobia. Feels he was unfairly criticized by a professor. Fears disease of genitalia. Feels more stable, confident, more able to enter social relationships, less self conscious and introspective. Feels first two years caused "hell of an inferiority complex" which he has outgrown. More tolerant. A little cynical about religion. Impression: Fairly well oriented with strong conscience, feelings of guilt regarding sex relations with married woman and his own broken engagement. Analytic type. Medicine created and corrected some neurotic reactions.

The following is an example of *Group III* or the *definitely neurotic*, yet who will be able to carry the burden of instability:

66. Reliable, clear, detailed. Family stresses increased desire to work. Feels he is an extravert, but indications are of moderate introversion. Neurotic symptoms developed after study of medicine. Points of significance:

Syphilophobia. Worries about renal disease. "Father has kidney lesion" and student has great fear of his father's death in distant country area. Attachment to father. "My father, whom I know has a kidney lesion and who is living miles away may have a sudden catastrophe and I would be unable to cheer and comfort him." "Dad and I are more pals than father and son." Unhealthy curiosity about people's mental processes. "Father confessor to younger men." Realized in medicine the difficulties of parenthood. Resorted to alcohol to ease depression and strain. Studied medicine in desire to help others. Hobby is pistols! Makes "friends easily with the masculine type, tall, erect." . . . "The small male with soprano voice is to be pitied rather than befriended." Reaction to delivery disproportionate. "The difficulties of delivery, pains of child birth, and gamble with life that women take brings forth my sincerest admiration for any woman who has been a mother." In answer to the question about doubt concerning masculine make up, student writes: "Let sleeping dogs lie." . . . "The desire of being a leader in the profession prohibits feminine entanglements, too much at stake to attempt a serious thing like matrimony without any worldly goods." Fears disease of kidney and lungs. Fears lues. "Some day I intend to marry and expect to have a family of healthy children with tall sons." Reaction to dissecting room: "Skinned a human and a slight squeamishness." Sputum and feces cause difficulties of the G I tract. "I don't like filth on my hands." Contact with venereal patients increased "fears of infection leading to extra precautions and free use of rubber gloves." Embarrassed in "making a rectal on a decidedly pretty patient." Feels more tranquil, more stable, capable, more serious minded, in professional and social relations. More self confident by reason of practical work. Impression: Markedly neurotic.

Group IV is the *markedly unstable* group whose prognosis is uncertain:

56. Extravert personality who classes himself as an introvert. Frank. Feelings of self consciousness and inferiority somewhat overcome after a period of exaggeration. Needs all props of medicine to feel confident. Builds up defense against belief in inferiority. Became cyclothymic in medical school. Needs alcohol as a social prop. Hard to concentrate, almost morbid difficulty in making decisions. Examined semen under microscope. Depressed by misery. Irritable before examinations. Day dreams. Self accusatory about ambition and accomplishment. Would like to talk to a psychiatrist. Lost outside interests in medicine. Fewer friends. Does not make friends easily. More sex desire. "I have enjoyed coitus with four women consecutively, have ejaculated on dates, and have masturbated one to ten times a month. I have never gone with a prostitute. . . . No one is normal and I have been interested in (not afraid of) the abnormalities I have seen in myself. . . . With the prospect of an M. D. after my name in a few months, and with some practical knowledge possessed by a small part of the population, and with an attractive internship ahead of me—with all these props I have more self-confidence."

60. Clear, frank, reliable, detailed. Extravert. Exaggerated old and created new neurotic tendencies. Headaches, abdominal pains, palpitation, nausea, myoclonus. Fear of rheumatic condition. Sensitive. "Aloneness." Nausea when under emotional strain. Absent minded when depressed. Fears instability will interfere with professional future. Self conscious. Day dreams of professional future and home. Socially unhappy. Dislikes to see patients nude before class. Prior to medicine was enthusiastic, friendly, rarely unhappy. Since medicine, has developed an emotional withdrawal. Thinks medicine has helped in correcting some infantile attitudes. Likes poor people more. Life is more meaningful. More tolerant and less dogmatic. Religion and science were in harmony. But medicine has influenced the individual unfavorably: produced asocial qualities, became aggressively individualistic, over-serious. Feels more inferior socially, but more self confident professionally. Finding happiness in sharing people's lives and helping them. Attempts at self-analysis. Religion strengthened. Intellectually and vocationally understands self better and has been helped. Yet emotionally more unstable. Markedly neurotic.

Group V is the group that at present possesses or gives a history of possessing such *serious instability* that we think their *future adjustment* is *precarious*:

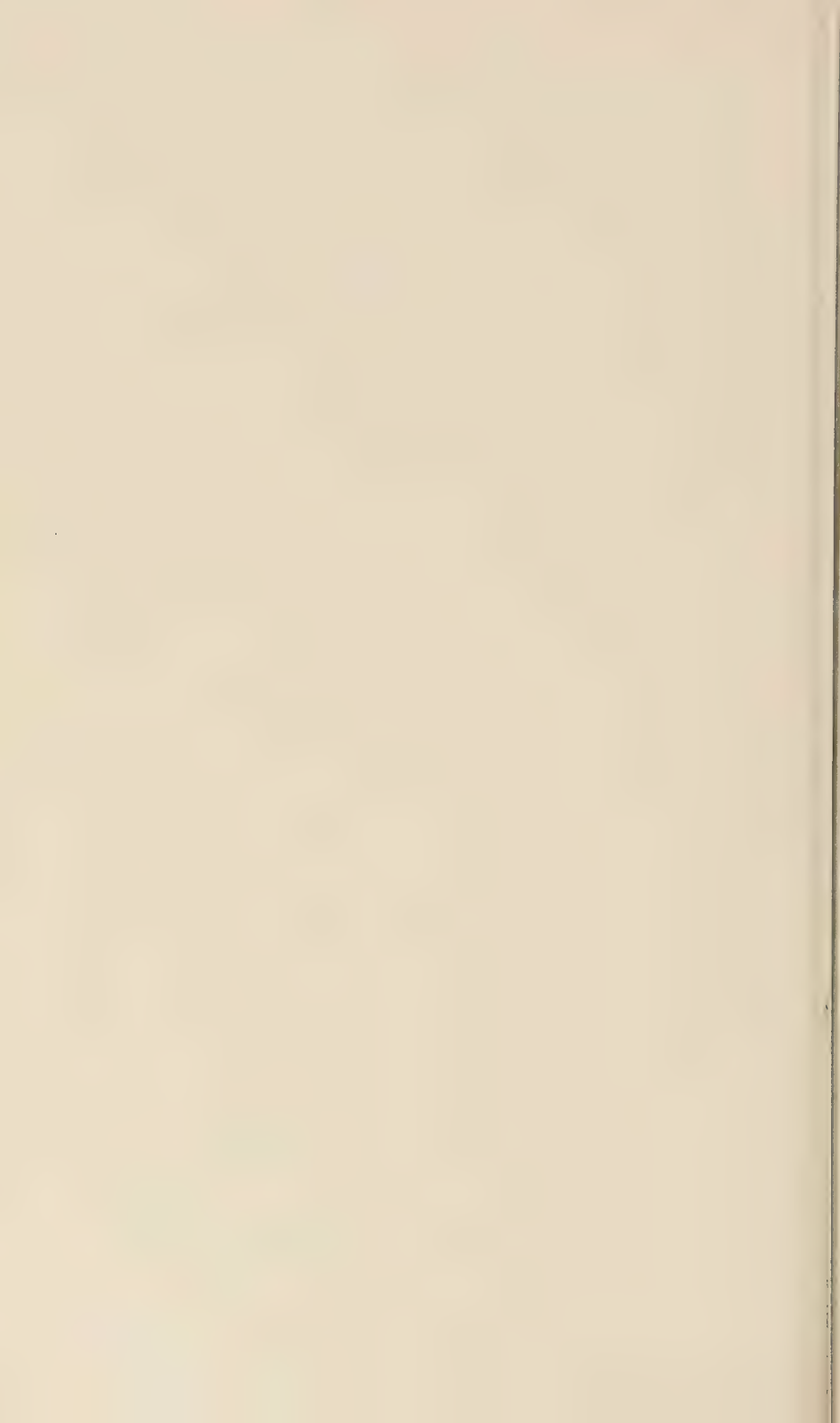
101. Frank (occasional promiscuity), detailed, reliable, but at times irrelevant. Question: "How have your medical studies and experiences influenced your relationship to men and women and to society in general?" "Have they made life mean more or less?" Answer: "Churches are run by ministers who know no more of the truth and perhaps not as much as the scientist, who is perhaps better fit to interpret the Bible than the minister under the assumption that the writers were more fit than the present scientists." Question: "Have your ideals of womanhood or parenthood been in any way changed by your experiences in medicine?" Answer: "Evolution is to produce a better race. The picking of a mate must be at least as intelligent and desirable as a boy's mother or we get degeneration. The girl must likewise to reach a higher plane pick one as good or better than father. . . . I would like to find a mate and get children, 3 or 4 at most, before I was too old to enjoy them, and educate at least 2 sons and even daughters in medicine, whether or not they ever practice." . . . At times this individual states opinions without answering the question. At times hastily answers in negative where later elaboration and evidence contradict his answer. For example, he says in answer to one question that he has no fear of venereal infection. Later he says, "I have tried to cease all worry and fear about venereal infection." Or, "Have you become more conscious of either physical or mental defects since your study of medicine?" Answer: "No." Yet in answer to the question, "During your period of medical study has your physical condition remained the same, has it been better or has it been worse?" he replies: "Constipation has become worse." A fear of cancer of colon and some vascular disturbance because of purple nail-beds.

"The latter are probably the same as before because I wasn't thoughtful enough to notice them until second year in Physical Diagnosis course." Or. "Do you have difficulty making decisions?" Answer, "Not as a rule." Then in answer to another question he says he has become more timid, inadequate, and inferior. "No longer can I give one definite answer to a question." "I will not proffer an answer to which I know an answer as I dread the chance that it might be wrong." Not always clear. Had neurotic traits before entering medical school (over-sensitiveness, self consciousness, asocial, introvert, who was reserved and submissive). In addition had constipation, and cold, numb, tingling, cyanotic fingers. Medicine increased neurotic symptoms and developed worry about physical health and developed new symptoms. Studied medicine because he had many relatives in medicine and also because of dissatisfaction with other studies. Felt not well prepared for medicine and perhaps felt a family handicap. Believed his memory was not well trained, and thought too much was required to be remembered in medical school. Felt overwhelmed by the voluminousness of what was required. Got less sleep and exercise. Had more fatigue. Developed considerable restlessness. Become more timid, inadequate and inferior. Developed indecision, did not volunteer answers because he dreaded he might be inaccurate. Blushed more. Felt embarrassed and self conscious with superiors and embarrassed making gynecological and rectal exams. Ability to concentrate decreased. Worried and became depressed and was sent to a psychologist. Afraid to consult professors for fear, because of lack of knowledge, he would be advised to drop medicine. Thought he might discover something wrong with himself psychiatrically. Worried over alternating diarrhea and constipation and anxiety that he had cancer of colon. Relations with instructors not good, discouraged by attitudes of some instructors and felt that a professor purposely added to the difficulty of a course, so that one semester was almost unbearable. Unstable about sex and religion. "A healthy life is one of absent suppressed desires." . . . Occasional promiscuity. . . . "I have tried to cease all worry and fear about venereal infection." At times felt "doomed to failure." Social relationships still unsatisfactory. Worry over "religious adjustments which seemed all sex." . . . "Church prevents much mental disease." . . . "Nothing is lost on betting on God." Feels the need of better orientation in philosophy. Will enter general practise. Notwithstanding his increased instability he feels he has been benefited. "I believe I have become a better fellow." "I am not as interested in self glory but more in being accepted by the herd." "I am still an introvert, but have insight into the advantages of being an extravert and am trying to change over." Feels the need of better social adjustment. In summary, had some neurotic traits before entering medical school, became very markedly and seriously unstable in course of medical studies, acquired some insight into desirability of better social adjustments. Impression: Most difficult paper. Frank, but often either irrelevant or almost incoherent at times. Seriously unstable. Pre-psychotic.

31. Clear, definite, frank, reliable. Extravert. Definitely cyclothymic. Constriction in abdomen. Dyspnoea. Pain around heart. Pain in chest. Indi-

gestion. Feelings of fullness in rectum. Had several periods of depression. Somatic symptoms. Hard to concentrate. Great difficulty in making decisions. Tremendously attached to mother. Quarreling of parents influenced patient. Economic stresses. Felt his abilities limited by neurotic symptoms. Rarely alcohol. More at ease with it. Began to smoke in medical school. Would like to consult a psychiatrist. Worried about sex in depressions. No change in religion. Worried about insanity in family. Has acquired better understanding of his symptoms, and worries less since entering medical school. Emotional equilibrium more stabilized. More self confident. Summary: Somatic and emotional handicaps. Marked instability. Neurotic attacks before medical school. Influenced favorably and controlled by medical training. Periods of depression in medical school. Family stresses and quarrels, and attachment to mother influenced patient adversely. Gained understanding of self and problems in study of medicine. First depression at 15 years. Worried over illness of sister and mother. Periods of "emotional numbness and lack of interest." Seriously unstable.

This introductory paper has presented the formulation of the study, a discussion of methodology, our principles of classification and evidence for the reliability and value of our studies. The papers to follow will deal with a statistical presentation of data obtained, an analysis of our findings and certain conclusions.



COLONY GHEEL.*

By A. J. KILGOUR, M. D., TORONTO, ONT.

During the summer of 1935 it was my good fortune to pay a visit to the small town of Gheel in northern Belgium. It is there that the now world famous mental colony is located; where thousands of patients are cared for and treated as they live in private homes in the community. Gheel claims the honor of having originated the "boarding-out system," and has a history that goes back to the latter part of the sixth century. In other places and in other lands this method has been adopted as an experiment or as an expedient because of overcrowded mental hospitals; but at Gheel it has been the only method used throughout all the years and has always met with satisfaction and success.

The story of the origin of the colony is closely linked to events that occurred in the life of Dymphna, the daughter of an Irish king, about the year 600 A. D. The father, according to the legend, was a pagan but the mother, a virtuous and noble character of great personal beauty, was a fervent Catholic and had been allowed to rear her daughter in the Catholic faith. It turned out that Dymphna, as she advanced in years, decided to consecrate herself to God, to become a bride of the church. Unfortunately, the mother died before this plan came to fruition and tragedy quickly followed. The king, for a time, was inconsolable over the loss of his wife; her graceful form and comely features were continually in his mind. After a period of mourning, however, he decided to try to find consolation in a second marriage and sent his agents throughout the land with instructions to find some lady resembling as closely as possible his deceased wife. The messengers, in spite of very diligent searching, returned to report complete failure. They had been unable to discover anyone with the desired resemblance. It was then suggested to the king that there was only

*For a more extended account of the operation of Colony Gheel by its director, see "The Care of the Insane Outside of Institutions" by F. Sano, M. D. in the Proceedings of the First International Congress on Mental Hygiene, Washington, D. C., May 5-10, 1930, Vol. I, pp. 379-391.—Editor.

one, his own daughter Dymphna, who bore the desired resemblance and he was advised to propose marriage to her. Incestuous marriages were common in the pagan nations of that time and the idea met with approval by the king. He proposed marriage to Dymphna. She was horrified at the suggestion but, knowing the strong will and impetuosity of her father, asked for time to consider before giving a final answer. The king consented to this and Dymphna, accompanied by her counsellor and friend, the venerable priest Gerebern, took advantage of the delay and fled from Ireland. They made for the continent; sailed up the river Scheldt and landed at Antwerp. From there they proceeded inland until they found a secluded spot in the forest near the river Neeth, about three miles distant from the present center of the town of Gheel.

The king was very angry when he learned what had happened and at once set out in search of the fugitives. They were traced to Belgium and eventually located in the vicinity of Gheel. The king, when he arrived there, tried to persuade Dymphna to return to Ireland with him but Gerebern rebuked him for his wicked proposal and counselled her to refuse. This enraged the king and he ordered his men to put the priest to the sword and this was done. Again the father tried to persuade Dymphna to go with him but she persisted in her refusal and scorned his threats. He became wild with rage and ordered his men to kill her also, but no one had the courage or hardness of heart to carry out the command and the result was that the king drew his own sword and killed her himself. This happened on the thirtieth of May, near St. Martin's chapel in the vicinity of Gheel. The traditional spot is marked by an oratory containing two statues representing the king in the act of killing his daughter. The bodies of Dymphna and the priest were buried by the inhabitants at a spot where afterwards the magnificent church of St. Dymphna was erected.

The story of these events spread abroad. The king was believed to have been insane and Dymphna's martyrdom was considered to have been a triumph of wisdom and chastity over the insane devils of lust and impurity. Because she had been able to resist the insane desires and demands of her father and to remain unsullied, the belief spread that God had granted her the privilege of being the special saint of the victims of mental maladies and soon the relatives and friends of the insane were bringing those so afflicted to



ADMINISTRATION BUILDINGS, COLONY GHEEL.



MAIN HOSPITAL GROUP (1921-1925). OBSERVATION PAVILLION FOR MEN ON THE LEFT; WOMEN ON THE RIGHT.



A FOSTER FAMILY AT MEAL TIME. TWO PATIENTS ON THE LEFT.



INTERIOR OF A VILLA FOR PATIENTS OF THE UPPER CLASS.



CHURCH OF ST. DYPHNA SHOWING THE ANNEX WHERE MENTAL PATIENTS WERE FORMERLY CARED FOR. THIS FACADE DATES FROM 1683.



PILGRIM'S FLAG, TO BE FASTENED TO A SHORT STICK ALONG THE SHORT SIDE, CARRIED IN THE ANNUAL PROCESSION IN HONOR OF ST. DYPHNA.



ST. DYMPHNA AND THE DEMONIACS. CHURCH OF ST. DYMPHNA.

her tomb with the hope that she might intercede on their behalf. In the beginning the patients were cared for, over a nine-day-period, in a little dwelling called the infirmary, which was built against the church. During the novena of prayers they were blessed with the relics of St. Dymphna and prayers were said over them by the priest. In many cases cures occurred within the nine days and the patients would return home. In other cases the novena would be repeated and owing to the limited accommodation in the church annex the patients would be lodged for indefinite periods with families living near the church. This was the beginning of the "boarding-out system" at Gheel.

The church with its annex and the rooms in which the patients used to be cared for well repays a visit to-day. One room, in particular, has several beds that were formerly occupied by patients, and fastened to the wall near the old fireplace are samples of leather appliances that saw service when disturbed patients had to be restrained. There are volumes of old record books in a glass cabinet in this room also. The earliest written records pertaining to patients are dated 1693 and show the names, the towns from which they came and the names and addresses of the foster families to which they were sent. In the library of the church is a copy of a report dated 1247, which embodied the findings of a commission sent to Gheel by the Archbishop of Cambrai (France), who had heard rumors of the remarkable things transpiring there and desired to have authentic information. The result of that report was the canonization of Dymphna as a saint. A larger church was subsequently erected and on the fifteenth of May each year a procession through the streets of Gheel celebrates the event. In the main body of the church above the altar there is a beautiful gold screen on which is depicted the story of the legend of St. Dymphna. Among the relics which are carried through the streets, on the anniversary of her canonization, is a flat piece of reddish-brown stone which is said to have been taken from her tomb and which used to be applied to the necks of the patients as part of the treatment they received.

The Gheel of to-day is a pretty little town of brick and stone houses and shops, with interesting winding streets, plenty of trees and shrubbery and a population of about 20,000. It is in an agricultural district, about 25 miles from Antwerp. If, upon alighting

at the station one inquires the way, one is simply directed to call the colony by telephone; no number is necessary, so significant is this great institution in the little town.

For centuries at Gheel, just as in other parts of the world, the treatment of the mentally ill was directed almost entirely by the church. These were the years when mental disease was thought to be a spiritual matter and the sufferers thought to be possessed by devils. This was naturally so at Gheel because of the traditional origin and early development of the colony on a religious basis. In keeping with progress in other countries, as the true nature of mental illness came to be recognized, medical men gradually became associated with the work there also. During the fifteenth century, the population and the patients having greatly increased in numbers, certain laws were passed by the mayor of Gheel and the colony became partly communal as well as religious. At the time of the French revolution, patients were admitted into a small infirmary and into rooms of the municipal hospital. In 1852 the colony was taken over by the state and definitely placed under medical direction. Dr. F. Sano is the present medical director and has served in that capacity since 1919. He is assisted by a staff of seven other physicians.

The headquarters of the colony is situated across town from the railway station, at the fringe between town and country. It is a modest group of red brick buildings and consists, chiefly, of the administration offices and a 100 bed infirmary. The latter serves as a reception hospital for newly admitted cases and is also used for the treatment of the occasionally physically sick or disturbed patients that require closer medical care and supervision than can be given in the homes. Elderly patients that have become too feeble to be in boarding homes are looked after there also. It has in connection with it a surgery, dental clinic, dispensary and laboratory. About a quarter of a mile away from the main group of buildings there is a modern school where children of school age, who are patients in the colony, receive their education.

In July, 1935, the patient population was slightly in excess of 3000. With the exception of a few recent admissions and a few elderly feeble individuals of both sexes, this large number of mentally ill were living in private homes in the community. The colony is quite widespread, comprising not only the town of Gheel,

but a large area beyond, in all about 30,000 acres. It is divided into six districts with a physician in charge of each. He makes his rounds on foot or bicycle, visiting the new admissions daily for the first fortnight and the others at least once a month. The physicians have nurses to assist them in their sectors. No family is allowed to have more than two patients and where there are two they must be of the same sex. Many nationalities are represented; 45 languages or dialects may be heard spoken in the colony at the present time.

Patients enter Colony Gheel on either a voluntary or certificate basis. The first few days are spent in the infirmary while arrangements are completed for boarding out, and during this time a thorough medical and psychiatric examination is carried out. The finding of a suitable foster home is no problem at Gheel. There are more homes available than there are patients to go to them and there are still numerous applications, from families desirous of having patients, waiting the approval of the authorities. All applications are passed on by the mayor and chief coroner, and approval is only given after a very careful investigation. It has come to be recognized that the having of patients is an indication of high standing in the community. The family that has no patients and has never had any is very apt to be regarded with less respect. The boarding of patients is not restricted to any particular social level. There are lower, middle and superior class homes according to the quality of the accommodation. Undoubtedly the possibility of making some extra money has an appeal, but there is also the desire on the part of the inhabitants to share in a great humanitarian work which has been a part of the community life for centuries. The rates are reasonable, varying from about \$15 a month for the lower class home to about \$50 a month for a superior class one. All financial matters are arranged through the administration office and not directly between patient or relatives and the family lived with. Clothing and other such necessities are provided by the patients or their relatives. The institution receives a percentage of the rates charged (16 per cent) and this is found to be sufficient to cover upkeep, salaries, etc., but not capital expenditure.

The patients are not forced to work, but occupation is encouraged and plays a large rôle in therapy. There is abundant opportunity for varied and interesting occupation both in town and

country. No cash remuneration is given for work done, but a patient working will receive from the head of the family he lives with such pocket money, on Sundays, as others in the family are accustomed to receive.

As might be expected under such a system, problems do arise. Some patients become unduly disturbed and others develop tendencies that render them a menace in the community. In such cases the patients are brought back to the infirmary for a time and returned to the boarding-homes after the disturbances or tendencies have abated or passed off. If, after a period, boarding out is considered inadvisable, a transfer to one of the closed mental hospitals is arranged. There is also the occasional attempt at elopement, especially during the early days of stay in the colony. It is very seldom that a patient succeeds in getting entirely away because the district is so large that one may walk all day long and still be within its area. The restless wanderer is usually recognized by some one in the community and either returned to the home he has left or to the institution. It is rare for patients to attempt elopement after they have become adjusted to the new surroundings. As a rule, they become very happy and contented as might be expected where conditions are so much like the normal home ones. I saw a striking illustration of this attitude while I was there. I happened to be in the main office, talking with Dr. Sano, when a young woman, a mild schizophrenic, entered and announced her return from vacation. She had been visiting at her own home for two weeks, had made the journey there and back by train unaccompanied, and expressed genuine pleasure in being back in the colony again. She said that she was happier and more contented in the home where she was boarding than she was in her own home.

There are, of course, the problems related to sex, alcoholic indulgence and other such matters that one might expect to be unusually bothersome in a place of this nature. Incidents do occur but are relatively infrequent. The explanation is to be found in the careful supervision patients receive from the families with whom they live and also by the other members of the community as a whole.

I was able to visit many homes where patients were boarding. They were all in the vicinity of the hospital and included examples of the different grades. They were selected quite at random by Dr.

Sano as we strolled along and it appeared quite obvious to me that I was seeing things in the natural state and without any "window dressing" for a special occasion. It was most impressive; the home atmosphere with its warm companionship; the sense of absolute freedom and lack of restraint; the contentment radiated by the patients. There was a decided contrast in the reactions of these patients to that which one meets with in even the best conducted closed institutions.

It may be impossible elsewhere to develop the boarding-out system exactly as it is conducted at Gheel. The religious element, which played such a big part in its early history, cannot be made to order. St. Dymphnas are uncommon to-day. The soundness of the principle of the boarding-out method has come to be more and more widely recognized however; and it can confidently be said that with sufficient community interest and support family care as an adjunct to hospital treatment should be practicable anywhere. It is certainly economical for the state and provides a more normal and happier life for countless numbers of the mild-coursing and chronic types of mental patients.



CATALEPSY OR CEREAL FLEXIBILITAS IN A THREE-YEAR-OLD CHILD.*

By A. BLAU, M. D., AND S. H. AVERBUCK, M. D.

The subject of cereal flexibilitas or catalepsy in children has received scant attention. Only sporadic reports have appeared in foreign medical writings while no reference to this condition is to be found in the American literature.

The purpose of this communication is to describe the occurrence of catalepsy in a three-year-old child, who except for some mental retardation was normal. The significance of this case lies in the circumstance that a consideration of this manifestation in a child may help throw light on the general problem of the nature of catalepsy.

H. S., a female child of three years and four months was admitted to The Hebrew Orphan Asylum, New York City, April 18, 1934. She was committed to the institution through the Children's Court because of her parents' inability to give her adequate care.

Family History.—The parents had been separated for three years. The mother was known to social service agencies and during the course of observation had been examined by psychiatrists at the Bellevue Psychiatric Hospital. She was judged to be a mental defective of low grade moron level and on the Army-Performance test attained an intelligence quotient of 49. She showed psychopathic trends, such as hysterical tantrums and irritability. The father likewise was judged to belong in the low moron group of feeble-minded with an intelligence quotient of 52 on both the Stanford-Binet and Army-Performance tests. An elder sister, the only sibling, was committed to Randall's Island because she was a high grade imbecile. Her intelligence quotient was 41.

Previous History.—The patient was born at normal term; delivery was uncomplicated. She was bottle fed from birth. There had been no serious illnesses. Relatives stated that walking and talking occurred in normal time. Very soon after her birth the child and her feeble-minded sister were placed in the care of an old aunt and uncle who lived amid very squalid circumstances. In this environment she grew to the age of three, learning to speak and to understand Yiddish only. At this time she was transferred to The Hebrew Orphan Asylum.

Examination revealed a rather obese child with flabby musculature. The head was large and there were frontal bosses. There was a general rachitic development with flaring ribs and a pot belly. The tonsils were

* From the Neurological Service of Dr. I. Strauss, The Mount Sinai Hospital and from The Hebrew Orphan Asylum, New York City.

moderately enlarged and adenoids were present. The heart and lungs were normal. A pilonidal sinus was present. Hypotonia of the knee joints with genu valgus existed. Vaginal smear, blood Wassermann and urine examination were all negative. The height was 35.5 inches (88.75 cm.); weight was 34 pounds (16.2 kilo.).

Because of the mental defective hereditary background and the fact that the contact with the child was inadequate on account of language difficulty, it was thought at first that the patient might also be defective. Her age and the language difficulty made an accurate mental rating impossible. However, the child was observed to be attentive, aptly imitative and able to carry out simple orders. It was felt that in all probability she possessed a dull normal intelligence and that she had been severely handicapped by poor training. Therapeutically, it was considered sufficient to place the child in the environment of normal English speaking children.

Soon after her admission to The Hebrew Orphan Asylum the patient developed chickenpox. On the first day of this sickness she was examined by one of us (SHA). While searching the body surface for chickenpox lesions it was noted that if the extremities were placed in any position the child maintained this posture until the position of the limbs was again changed by the examiner. The most unusual positions were maintained for many minutes—in fact until the limbs were actively replaced. This was a constant phenomenon and could be demonstrated repeatedly. During the next three weeks while the child was being treated for chickenpox, these cataleptic phenomena continued. After recovery from the varicella, which ran a typical and uncomplicated course, the patient was sent to The Mount Sinai Hospital for a complete neurological investigation to determine the cause of this remarkable symptom, *i. e.*, cerea flexibilitas, in an ostensibly normal child.

She was admitted to the service of Dr. Israel Strauss where she was studied from June 7 to July 2, 1934. During the hospital stay, the original observations were confirmed and the following data added. The gait and the associated movements were normal. The body musculature was flabby and there was a marked general hypotonia. Although the head was held in the erect position, the general posture was poor. The child appeared to see and to hear well. The position and movements of the eyes were normal and there was no nystagmus. The pupils were equal, regular and reacted to light and to accommodation. The corneal reflexes were equally active. The fundi were without change. The innervation of the face, jaw and tongue muscles was normal. All the tendon reflexes were brisk and lively. This hyperactivity was especially marked in the knee and ankle jerks. The plantar responses were poor though there was neither a Babinski sign nor any of the confirmatory pathological reflexes. The Romberg test was negative, and the sensory status was normal.

A cataleptic attitude was assumed by any of the limbs when it was raised. (Figures 1-4.) The extremities remained in the most awkward positions for considerable lengths of time and the child appeared unaware of the position of her limbs. They finally dropped slowly to the rest position without trembling. These postures very closely resembled those seen in catatonia and in hypnosis.

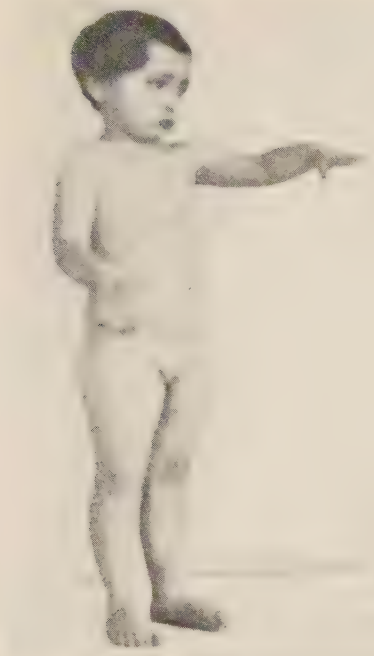


FIG. 1.



FIG. 2.



FIG. 3.



FIG. 4.

The patient did not become well adjusted to the environment of the ward, and seemed happiest when left alone in her crib. She did not easily make friends with either the nurses or physicians. Appearing to understand what was said to her, she cooperated in the examinations. Her spontaneous speech was very meager, and she responded with the single word "yes" to all questions. In a simple memory test, she remembered the hiding place of a penny after ten minutes. In general, the intelligence was estimated to be somewhat below normal.

There was no fever throughout the duration of the hospital stay and the urine analysis and blood count were normal. The spinal fluid was clear and under normal pressure. The sugar content was 65 mgs. per cent, chlorides 725 mgs. per cent, and the total proteins 25 mgs. per cent.

After a four weeks' period of observation the child was discharged from the hospital. In the next six months she developed rapidly in the relatively normal environment of The Hebrew Orphan Asylum. She learned to understand and to speak English and became an active and intelligent participant in the games and other group activities of the Home.

On examination in October, 1934, three months after discharge from the hospital, the cataleptic attitude of the limbs could still be demonstrated. A psychometric examination at this time showed an approximate intelligence quotient of 84, (Binet) with a mental age of three years two months, and an approximate mental age of two years eleven months on the Merrill Palmer scale of mental tests.

In December, 1934, although still demonstrable, the cataleptic postures were not maintained for the same duration as before. When seen in February, 1935, the *cerea flexibilitas* had completely disappeared. When her arms were raised, contrary to previous observations, the child immediately allowed them to drop to her sides. Mentally, the child displayed excellent cooperation, interest and attention. The speech was fluent and much easier to understand than at the time of the previous examination. The psychometric tests showed a remarkable improvement. On the Binet test she attained a mental age of three years ten months and an intelligence quotient of 94, and the score on the Merrill Palmer scale was now on the three-year level. There was no doubt at this time that the child was of normal intelligence.

To summarize, the case is one of a three-year-old child, who had a strong hereditary mental defective background, and who showed the unique phenomenon of catalepsy. Except for this symptom and a suggestion of intellectual retardation, the examination revealed no abnormalities. During a ten months' period of observation, the catalepsy became gradually less marked, and an accompanying remarkable progression in the intellectual development occurred.

A search of the literature for reports of similar cases yielded only a few references to catalepsy in children. Under the title "Cataleptic Phenomena in Rachitic Children," Epstein¹ in 1896 described a group of eight children varying in age from 1½ to 3½

years, who showed cerea flexibilitas, especially marked in the lower extremities. All these children were rachitic and they had defective alimentation and poorly developed musculature. Their intellectual development also was markedly retarded. Because all eight children had rickets, the author thought that an etiologic relationship existed between the rickets and the catalepsy.

Recently, Surányi² published the report of a case which possesses similarities to our own. He made the statement that within his knowledge catalepsy in so young a child had never been described before. It seems pertinent to summarize the main features of Surányi's paper.

The patient was a three and a half year old female child who was retarded developmentally, both physically and mentally. She was a symmetrically underdeveloped child resembling a one-year-old, talking poorly and unable to stand or walk. The most striking feature of the case, however, was the maintained cataleptic attitude of the arms and particularly of the legs when they were placed in any position by the examiner. The complete neurological status was otherwise normal and all laboratory tests were negative. It was estimated that although the intelligence was below the normal for her age, it was, nevertheless, comparatively further advanced than the physical development.

Surányi did not attempt to explain this curious condition. He merely drew attention to the association of catalepsy and marked developmental retardation.

A more comprehensive report on the occurrence of catalepsy in children was published by Collin.³ He found that if the extremities of normal children under 32 months of age were placed in any position, the posture could be maintained for extended periods of time (up to 45 minutes). The limbs were held immobile, and the subjects seemed disinterested in the unusual positions of their extremities. There was no evidence that the experiments were ever tiring or painful; they never occasioned a change of humor and could be repeated at any time without objection.

Children, however, from 32 months to 6 years of age displayed great difficulty in maintaining their limbs in the given positions. After a few minutes the extremities would begin to tremble and then to move. The attempt to hold the postures necessitated great effort and caused considerable fatigue. These subjects took the

first opportunity to resume a more comfortable position, often expressing their satisfaction with a sigh of relief. These older children, one might say, showed the usual adult reaction.

This striking symptom in the first group of younger children, Collin terms "resistance to fatigue." It is clear from his discussion that he considers this manifestation analagous to catalepsy as ordinarily seen in catatonia and in hysteria.

Collin found that this so-called "resistance to fatigue" co-existed with the other neurological signs seen normally in infants, *i. e.*, hyperreflexia and the Babinski phenomenon. In the course of normal development, coincident with the disappearance of these signs, "resistance to fatigue" gradually became less marked, and finally could not be obtained. Collin presented this manifestation as an additional characteristic of the physiological immaturity of the nervous system of the infant, and maintained that the gradual disappearance of these signs indicated evolutionary development of the infant's brain. Furthermore he ascribed a special prognostic significance to this sign in infants because it did not appear in a large control group of mental defectives. Inasmuch as it was the last of the objective neurological signs of infancy to disappear, its persistence indicated a physiological retardation of the development of the central nervous system. Thus, in cases where there was a slow development of the intellect, this sign might help to differentiate between a temporary retardation of physiological evolution and genuine mental deficiency. He illustrated this with a case of a 4½-year-old child who because of mental backwardness was at first considered to be an idiot. However, cataleptic phenomena commonly seen in 2½-year-old infants could be demonstrated. On the basis of this observation, Collin gave a better prognosis. In six months, his prediction was substantiated by a remarkable mental improvement which justified the opinion that the child was not a mental defective.

DISCUSSION.

The cause of catalepsy is still a controversial subject. It is hardly necessary to discuss all aspects of the problem so we shall refer only to major contributions which are relevant.

A pertinent analysis of catalepsy is offered by Schilder.⁴ He points out that it is characterized mainly by two factors: "a lack

of impulses to the muscles" and "a muscle tonus of a special type." His conception suggests the conjoined activity of two levels of the brain, *i. e.*, the cortex and subcortex.

The subcortical component of catalepsy consists of "a simultaneous innervation with the minimum essential tone of the agonistic and antagonistic muscle groups." This is undoubtedly a function of the striopallidal system. Furthermore, *cerea flexibilitas* is not infrequently a manifestation of the encephalitic syndrome, in which cases the most marked pathological changes are found in the subcortical grey masses. Tilney and Howe⁵ describe a cataleptic form of epidemic encephalitis. An excellent review of the subject of the relationship between catatonia, catalepsy and basal ganglia disease has been offered by Jelliffe.⁶ It is also true that a somewhat modified type of catalepsy has been observed in association with cerebellar lesions (Babinski).⁷

According to Schilder, the "lack of impulse" would seem to indicate that the psyche plays an important part in the genesis of cataleptic phenomena. In fact, the older psychiatrists, including Kahlbaum and Kraepelin⁸ stressed the psychogenetic aspect. They considered catalepsy, as seen in catatonia, to be basically allied with the other signs of impaired volition. In connection with this volitional element, it may be recalled that catalepsy has often been observed in the most varied general medical conditions,⁹ characterized by an impairment of consciousness. In such instances the disordered mental state indicates a functionally impaired cerebral cortex, with which part of the brain it appears catalepsy is closely associated.

Among the most interesting modern contributions to the subject of catalepsy have been those concerned with its experimental induction in animals with bulbocapnine. The physiological action of this drug, particularly in its relation to catalepsy, was first studied by DeJong.¹⁰ Among other facts, DeJong demonstrated with a sensitive galvanometer that the muscles of the limbs of animals in bulbocapnine catalepsy were in continued tetanic contraction. On the basis of this observation, he suggested the theory that catalepsy was the result of tetanic contractions concurrently maintained in antagonistic groups of muscles. Thus he accounted for the sustained postures.

DeJong and Baruk (*l. c.*) in further investigations found that the action of bulbocapnine was not the same in all animals, and that it seemed to vary with the degree of development of the neocortex. This led to a systematic study of the effect of bulbocapnine in animals on different levels in the phylogenetic scale, *i. e.*, amphibians, reptiles, birds and mammals. It was determined that the frog, lizard, salamander, fish and turtle, animals which have only a rudimentary neocortex, did not develop cataleptic reactions. Imperfect phenomena were seen in birds, while the most complete catalepsy could be induced in mammals like the cat, mouse and monkey, which possess a highly developed neocortex. These observations were confirmed recently by Henry¹¹ who likewise concluded that "the extent to which catatonic manifestations may be produced is directly related to the degree of development of the neocortex."

Recently the action of bulbocapnine has been studied following surgical lesions of various parts of the brain in an effort to localize more definitely the site of its effect in the production of catalepsy. This phase of the problem has received the attention of Schaltenbrand,¹² Krause and DeJong,¹³ and more recently in this country by Ferraro and Barrera¹⁴ and Ingram and Ranson.¹⁵ There has been no concurrence in the results of these various investigators and so the problem awaits further elucidation.

In spite of all these clinical and experimental observations, the significant fact remains that catalepsy may also be the result of pure psychologic influences. As such, it is regularly seen in the early stages of hypnosis¹⁶ and occasionally in hysteria. The close relationship between sleep and catalepsy has been pointed out by Pavlov¹⁷ and Schilder,¹⁶ and Brissaud¹⁸ noted the phenomenon in the half-awakened child. Furthermore, it may be induced in animals by rapid immobilization or other strong and unexpected stimuli (Hempelmann,¹⁹ Coriat,²⁰). Additional evidence is available in the recent knowledge that human catatonic stupor may be temporarily interrupted by various drugs. This has been demonstrated by Berger²¹ and Jacobi²² with cocaine; by Loevenhart²³ and his co-workers, with carbon dioxide inhalations and by Lorenz²⁴ with sodium amytal administered intravenously. Even bulbocapnine catalepsy has been abolished with carbon dioxide inhalations.

There is a definite trend in neuropsychiatry to regard the nervous system as a functional unit (Meyer,²⁵ Schilder⁴), and to explain its abnormal manifestations on a dynamic physiological basis. The experimental application of this principle has received its greatest support in the work of Pavlov and his school. During his classical investigations on conditioned reflexes, Pavlov frequently encountered the phenomena of sleep and catalepsy. In his explanation he states that there occurs "a complete inhibition confined exclusively to the cortex, without a concurrent descent of the inhibition into the centers regulating equilibrium and maintenance of posture (centers of Magnus and de Kleijn)." ²⁶ The motor cortex is the one particularly inhibited, as other parts may continue to function in the presence of catalepsy. It is interesting that he offers a similar explanation for the catalepsy observed in urethane intoxication.²⁷

DeJong and Baruk (*l. c.*) invoke an analogous conception of a physiological cortical disturbance to explain catalepsy. Their theory is based on observations of bulbo-capnine catalepsy in animals with varying degrees of development of the neocortex (*v. s.*).

A number of clinical observers have independently supported this point of view. Wechsler²⁸ considered inadequate the interpretation that cerea flexibilitas was a simple involvement of the extrapyramidal system. He thought that it was rather due to a true cerebral condition or to an interference with cerebral function and consequently a liberation of uncontrolled unconscious activity. In a narcoleptic patient who developed catatonia, Miller²⁹ proposed a similar mechanism. He believed that catalepsy resulted from dominant extrapyramidal control owing to loss of cortical inhibition. He stated that forces outside the field of awareness must be regarded as neurological (even though they may be interpreted as symbolically infantile), as they are due essentially to the activity of the grey matter of the midbrain liberated from cortical control.

The dynamic conception that catalepsy results from the release of cortical inhibitory control over lower centers can be satisfactorily utilized to explain the phenomena seen in infants and in the child being presented in this paper. At birth the human infant may be considered partially decerebrate from a physiological viewpoint—because its cortex is incompletely developed. The last cortical function to develop is probably that of inhibitory control

of the activities of the lower and phylogenetically older centers. It is a fact that the early motor activity of the infant is primarily subcortical and strio-pallidal in character. The presence of the Babinski sign, the inability to walk and the deep tendon-reflex hyperactivity are objective neurological evidences of the cortical state of the infant. With the further mental and physical development of the child, there is a simultaneous recession of these signs. In the light of these considerations the occurrence of *cerea flexibilitatis* in a child who is somewhat mentally retarded is comprehensible, for in such a child there has probably been a physiological delay in the postnatal evolution of the cortical organization. This association between mental retardation and the presence of *cerea flexibilitas* is well illustrated in the children reported by Epstein¹ and Surányi.² Furthermore, our case and the one reported by Collin,³ which were observed for a longer period, show a remarkable regression of the catalepsy simultaneous with a relatively rapid improvement in the intellectual development.

From the standpoint of the conception outlined above, *cerea flexibilitas* can be viewed in this case as a physiological (or more accurately a patho-physiological) process attending a retardation of brain development with associated functional dissociation of the inhibitory cortical pathways to the subcortical centers.

SUMMARY AND CONCLUSIONS.

The case of a mentally retarded three-year-old child who showed the unusual symptom of catalepsy or *cerea flexibilitas* is presented. Following a period of observation, the catalepsy gradually disappeared simultaneously with a progressive improvement in the intellectual status. It is suggested that this type of catalepsy is physiological or developmental in nature. The relationship to the general question of catalepsy is discussed.

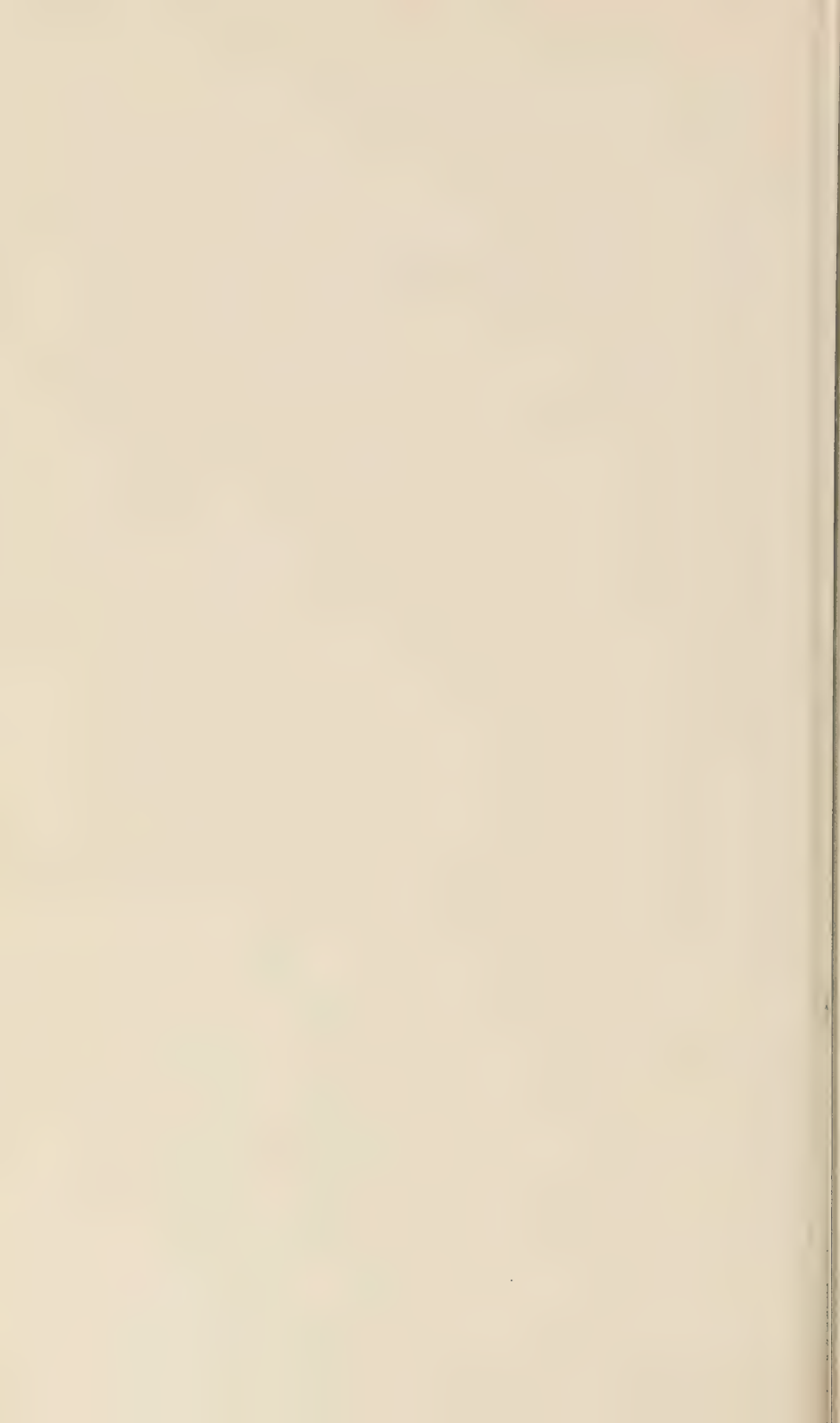
We are indebted to Miss Donah B. Lithauer, psychologist to The Hebrew Orphan Asylum, for the psychometric studies.

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Comment.

TWENTY-SIX YEARS OF MENTAL HYGIENE.

The 26th annual meeting of the National Committee for Mental Hygiene was held at the committee headquarters at Rockefeller Centre in New York City, November 14, 1935. At this meeting the General Director, Dr. Clarence M. Hincks, reported upon the activities of the committee during the year. One of the outstanding items was the launching of a project for research in dementia præcox. This inquiry was made possible by securing the cooperation of the Supreme Council, 33° of the Scottish Rite Masons of the Northern Jurisdiction of the United States. Last year the Supreme Council made a grant of \$15,000 to finance a preliminary survey, which should take account of research activities presently being conducted in this field. In consequence of this survey the Supreme Council has now appropriated a further sum of \$40,000 to subsidize selected research projects in dementia præcox in universities, hospitals and clinics for a period of twelve months. The allotment and administering of these awards are undertaken by the National Committee. This is the first instance in which the National Committee has enlisted the active support of a private benevolent organization for research, and it encourages the hope that other groups may be moved to like action.

Another important piece of work initiated during the year deals with vital issues in the field of education. Attention was directed first to the problem of teacher selection and training from the standpoint of mental health requirements and the issue of the teacher pupil relationship. Exploratory studies were conducted at several representative centers in various states and the province of Ontario. This study was undertaken with the cooperation of such outstanding educators as Dean Herbert E. Hawkes of Columbia University, Dean John W. Withers of New York University, Professor Edward S. Evenden of Columbia and Dr. M. Ernest Townsend, Presi-

dent of the New Jersey State Normal School. It is to be hoped that funds may be forthcoming to carry forward this significant new undertaking in the mental hygiene program.

At the 26th annual meeting of the National Committee Dr. Stewart Paton of Baltimore, delivered a notable address on "Making War and Making Peace." In view of the present disturbed state of world affairs Dr. Paton's remarks were particularly timely. Having been one of the scientific advisers of the government during the World War he was obliged sorrowfully to recognize the fact that the world had not yet learned its lesson. He recalled the fact that during the World War it came to be well understood that a soldier to be effective in warfare must be sound and mature in mind as well as in body. The program of preparedness for warfare is however in striking and painful contrast with preparedness for peace. "We have been exceedingly indifferent and reluctant," said Dr. Paton, "about informing ourselves as to the emotional and mental preparedness required to be peaceful and human, and relatively little progress has been made in finding ways and means for the pacific settlement of either individual or international problems. . . .

"Too many people are now engaged in trying to promote peace throughout the world who would not be competent to assist an individual in finding a peaceful solution of the problems that drive him to take refuge in a mental hospital."

Dr. Paton referred to the "emotional immaturity" which is the bane of our race and which too often appears to be reflected in political leaders in whose unsafe hands are sometimes lodged the destinies of peoples and nations. One of the hopeful signs of the times, however, is to be found in such movements as that of mental hygiene which Dr. Paton felt "can assist the American people in finding peaceful and rational solutions of their personal, business, industrial and political problems. . . .

"One of the dangers at present is that technical science has supplied us with means for annihilating the human race. This catastrophe can be avoided however, by securing the active cooperation of science and art, and mental hygiene can show the way in which we can secure this cooperation that is so essential to progress in the art of living."

DR. CHENEY TO DIRECT BLOOMINGDALE HOSPITAL.

On January 26 Mr. Augustine J. Smith, Secretary of the Board of Governors of the Society of the New York Hospital, announced that Dr. Clarence O. Cheney had been appointed Medical Director of the Bloomingdale Hospital at White Plains, N. Y., to take effect on or about May 15, 1936. As the members of this Association know, the Bloomingdale Hospital is maintained as part of the New York Hospital. It is the oldest hospital in New York state for the exclusive treatment of mental patients, the royal charter of the New York Hospital dating from 1771, the initial reception of patients in the original institution in New York City from 1792. Dr. Cheney plans to retire from the New York State Hospital Service this spring upon the completion of 25 years of activity in that Service.

In commenting on Dr. Cheney's appointment, Mr. Smith said:

At Bloomingdale Hospital Dr. Cheney will be engaged in continuing the New York Hospital's distinguished record of nearly a century and a half in the care of the sick, research and teaching in the field of mental disease. In 1792, one year after the opening of its first building, the New York Hospital began to accept patients suffering from mental disorders. In 1821 the Society established Bloomingdale Hospital in the open country on what is now the site of Columbia University, where it was for many years the only mental hospital in New York state.

Since its removal to White Plains, Bloomingdale Hospital has restricted its work to the care of persons in whom the outlook for restoration from their mental illness is reasonably good and to research and teaching bearing on causes, cure and prevention of mental illness.

The governors consider that they have been very fortunate in obtaining as medical director a man of such high ability and repute as Dr. Cheney, and look forward toward a continuation and advancement under his leadership of Bloomingdale Hospital's progressive record.

With the retirement of Dr. Cheney the New York State Service loses one of its ablest administrators. When Dr. Kirby retired as Director of the New York State Psychiatric Institute and Hospital, and as Professor of Psychiatry at the College of Physicians and Surgeons of Columbia University, Dr. Cheney succeeded to these positions. He has contributed materially to the prestige of the new institution and to the advancement of psychiatric training and research. As Chairman of the Board of Examiners of The Ameri-

can Psychiatric Association he has been a guiding influence in raising the standards of qualification for membership.

Dr. Cheney's successor at the Institute and at Columbia University has not yet been designated.

On behalf of his colleagues on the editorial board of the JOURNAL, the Editor would like to extend to Dr. Cheney most cordial good wishes in the new work and responsibilities he is about to assume.

C. B. F.

PROPOSED AMENDMENTS TO BY-LAWS.

Attention is invited to the following proposed amendments to the By-Laws of The American Psychiatric Association.

These will be acted upon at the ninety-second annual meeting to be held at St. Louis, Missouri, May 4 to 8, 1936.

Eliminate Article IV.

Re-number present Article V to be Article IV and have it read as follows:

Affiliated Societies.—When any state or provincial psychiatric society or psychiatric society of a geographic division in the United States or British America shall express a desire to become an affiliated society of The American Psychiatric Association, it shall submit to the Council of this Association a copy of its constitution and by-laws, showing the requirements for membership and a list of the members. If the Council recommends to the Association at an annual meeting that the said society be accepted and this recommendation be adopted by a vote of not less than two-thirds of the Fellows and Members registered and voting at the session at which the recommendation is submitted, the society making application shall thereafter be designated as an Affiliated Society of the Association. Societies designated as district societies previous to the adoption of this by-law shall hereafter be designated as Affiliated Societies.

It is recommended that the article to be designated as Article V be inserted in the By-Laws as follows:

District Branches.—When a group of not less than twenty of the membership of the Association residing in any state or group of adjoining states shall make application to the Council of this Association to organize a district branch of the Association and the Council approves, the Council may recommend to the Association at an annual meeting, the establishment of such a district branch, to be named according to the state or group of states where it is to be organized. The recommendation may be adopted by a vote of not less

than two-thirds of the Fellows and Members of the Association registered and voting at the session at which the recommendation is submitted: provided however, that no one shall become a member of the district branch who is not already in the membership of The American Psychiatric Association. Each district branch may elect its own officers, arrange its own programs of meeting and shall provide for its own expenses.

ARTICLE VI.

Section 2 of this article shall be changed to read: "A Section Chairman and a Secretary shall be elected by the Section. The Chairman shall be a Fellow of The American Psychiatric Association."

WILLIAM C. SANDY, M. D., *Secretary*.

December 27, 1935.

News and Notes.

CORRECTION.—In the September 1935 issue of this JOURNAL on page 495 in a notice of the activities of the Committee for the Study of Sex Variants occurs this statement: "Plans are far advanced for (1) a study of homosexuality as it exists among the members of the U. S. Marine Corps." The Committee for the Study of Sex Variants advises that in the submission of this notice the statement quoted should have read: "Plans are far advanced for (1) a study of homosexuality as it exists among the members of the U. S. Merchant Marine."

AMERICAN PSYCHOPATHOLOGICAL ASSOCIATION.—The twenty-sixth annual meeting of the American Psychopathological Association will be held in St. Louis, Mo., Thursday, May 7, 1936, in co-operation with The American Psychiatric Association.

The morning session will be a joint meeting with The American Psychiatric Association. If there are enough papers, and it is so desired, there will be round-table discussions in the evening.

Papers are necessarily limited to 20 minutes, and all titles must be in the hands of the Secretary, Dr. L. E. Emerson, 370 Commonwealth Ave., Boston, Mass., not later than the first week in February.

POSTPONEMENT OF THE SECOND INTERNATIONAL CONGRESS ON MENTAL HYGIENE.—The Executive Committee of the Second International Congress on Mental Hygiene announces that the Congress will be held in Paris in *July, 1937*, instead of in July, 1936, as previously announced. The Congress has been postponed because of the disturbed conditions existing throughout the world, and also because an International Exposition is to be held in Paris in 1937, which, it is assumed, many of the delegates will wish to attend.

The date in July, 1937, on which the Congress will open has not yet been set, but it will probably open on the 19th or the 26th of the month. The exact date of the opening session will be announced later.

Further information may be secured by writing to Dr. Edouard Toulouse, President of the Congress (1, rue Cabanis, Paris, France) or to Clifford W. Beers, General Secretary of The International Committee for Mental Hygiene (50 West 50th Street, New York City).

CONFERENCE FOR TEACHERS OF PSYCHIATRY.—The Division of Psychiatric Education of the National Committee for Mental Hygiene invites physicians engaged in the teaching of psychiatry in the medical schools of the United States and Canada to a three-day conference, at the Henry Phipps Psychiatric Clinic of the Johns Hopkins Hospital, Baltimore, April 8 to 10, 1936.

Correspondence is invited for the planning of the program, to assure brief communications of the patterns of local organization of material, staffs and aims and methods of teaching as developed, not so much for standardization as for a free presentation of the experience with what has been found most workable in undergraduate medical teaching. A maximum of 12 or 15 minutes for communications is suggested, with time for brief discussion—one day to be given to the actual organization of the courses under the various local conditions and the form and scope of the material considered essential in the various disease groups; another to the emphasis on the extent of time and staff allotments and on content of teaching of general and special psychopathology and methods of examination and organization of the material and therapy; and another day to the various ways of introducing the student of medicine to the consideration of personality problems, the teaching in general wards and in liaison work.

It is hoped that the presentations and discussions will be as concrete as possible, centering around the organization and actual work offered in your school during the present year. Since so much concerning the general organization of the teaching depends on local conditions the emphasis of the conference will be laid on the content, material and methods of teaching. The following headings are therefore suggested for our conference:

(1) The experience with out-patient teaching; in special and general hospital wards; methods of examination, organization of material and reports, and disposal of cases, including contact with the essentials of therapy; forms of clinical clerkships; provisions for autopsies and autopsy material and neuropathology.

(2) The most essential items emphasized in the teaching of the organic reaction types, the toxic-infectious disorders, the paranoic, schizophrenic and affective disorders, the psychoneuroses and the mental deficiencies and psychopathies.

(3) The range and organization of the basic teaching in psychobiology and general and special psychopathology; the equivalents of normal psychology and personality study, life periods, situation patterns and the essentials of psychopathology actually in use and available to the physician.

Preliminary correspondence on communications and concerning participation and desiderata is invited before January 20, to be addressed to Dr. Franklin G. Ebaugh, Director, Division of Psychiatric Education, The National Committee for Mental Hygiene, 50 West 50th Street, New York City.

REPORT OF THE NOMINATING COMMITTEE, 1936-37.—In accordance with the requirements of the Constitution the Nominating Committee for the year 1936 submits the following report:

For President: C. Macfie Campbell, Boston, Mass.

For President-Elect: Ross McC. Chapman, Towson, Md.

For Secretary-Treasurer: William C. Sandy, Harrisburg, Pa.

For the Council for one year replacing Dr. Kirby: Dr. A. A. Brill, New York, N. Y.

For the Council for three years: Clarence O. Cheney, New York, N. Y.; Samuel W. Hamilton, White Plains, N. Y.; William D. Partlow, Tuscaloosa, Ala.; C. M. Hincks, New York and Toronto.

For Auditor for three years: Max A. Bahr, Indianapolis, Ind.

EARL D. BOND.

ANNUAL MEETING OF THE AMERICAN COLLEGE OF PHYSICIANS.—The twentieth annual session of the American College of Physicians will be held in Detroit with headquarters at the Book-Cadillac Hotel, March 2-6, 1936.

Dr. James Alex. Miller, of New York City, is President of the College, and has arranged a program of general scientific sessions of great interest to those engaged in the practice of internal medicine and associated specialties. Dr. Charles G. Jennings, of Detroit, is the General Chairman of the Session, and is in charge of the program of clinics and demonstrations in the hospitals, medical schools and other Detroit institutions. Dr. James D. Bruce, Vice President in charge of university relations, University of Michigan, is Vice Chairman of the Committee on Arrangements, and has in charge the preparation of an all-day program to be conducted at the University of Michigan on Wednesday, March 4. Dr. Walter B. Cannon, Professor of Physiology at Harvard University Medical School, will deliver the annual convocation oration on "The Rôle of Emotion in Disease." Dr. Miller's presidential address will be on "The Changing Order in Medicine." About fifty eminent authorities will present papers at the general scientific sessions, while clinics and demonstrations will be conducted at the Harper, Receiving, Ford, Grace, Herman Kiefer and Children's Hospitals, of Detroit.

REPRINTS OF JOURNAL ARTICLES.—To meet frequent requests which are addressed to the JOURNAL for reprints of articles which have appeared in its pages it has been decided, beginning with the January, 1936, issue, to stock a limited number of reprints of all articles appearing in each issue. These reprints will be supplied at nominal prices covering reproduction costs, and may be obtained by addressing Mr. Austin M. Davies, Executive Assistant at the head office of the Association, 2 East 103rd Street, New York City.

DR. KASANIN APPOINTED TO MICHAEL REESE HOSPITAL.—Dr. Herman Smith, superintendent of Michael Reese Hospital, Chicago, announces the organization on January 1, 1936, of a psychiatric service in the department of nervous and mental diseases. This service will be headed by Dr. Jacob Kasanin, formerly the clinical director of the Rhode Island State Hospital of Mental Diseases, and lecturer in psychiatry at Brown University and Smith College School of Social Work. Previously Dr. Kasanin was con-

nected with the Boston Psychopathic Hospital, Boston, Mass., where he was the senior research associate in connection with the investigation of the social causes of mental diseases under the auspices of the Rockefeller Foundation.

The psychiatric service at Michael Reese Hospital will have an out-patient department as well as a small number of beds in the hospital, and also in the Sarah Morris Children's Memorial.

AMERICAN PSYCHOANALYTIC ASSOCIATION.—This association, founded in 1910, at its Boston meeting in December adopted a new constitution. The American Psychoanalytic Association, now a Federation of the American Psychoanalytic Societies, comprises the Boston Psychoanalytic Society, the Chicago Psychoanalytic Society, the New York Psychoanalytic Society and the Washington-Baltimore Psychoanalytic Society.

The following officers were elected: Honorary President, A. A. Brill, M. D. (New York); President, C. P. Oberndorf, M. D. (New York); Vice-President, Isador H. Coriat, M. D. (Boston); Secretary, Ernest E. Hadley, M. D. (Washington, D. C.); and Treasurer, Leo H. Bartemeier, M. D. (Detroit).

Book Reviews.

PELLAGROIDE DERMATOSEN AN GEISTESKRANKEN. MIT BESONDEREM HINBLICK AUF DAS VORKOMMEN SOLCHER BEI SCHIZOPHRENEN UND MIT BEITRÄGEN ZUR BELEUCHTUNG GEWISSE ÄTIOLOGISCHER UND PATHOGENETISCHER VERHÄLTNISSE BEI DEMENTIA PRÆCOX UND PELLAGRA. By *Paul J. Reiter and Jakob Jakobsen*. (Levin & Munksgaard, Copenhagen; Georg Thieme Verlag, Leipzig, 1935.)

The occurrence of pellagra and pellagra-like manifestations among inmates in mental hospitals has been of considerable interest to psychiatrists and students of the problem of pellagra since the classical description of the condition by Casal in 1762. Casal observed pellagra particularly often among alcoholics. Landouzy in 1863 systematically scrutinized the institutional material and reported 157 cases of pellagra among 25,015 patients in 47 psychiatric institutions in France. He thought that pellagra among the mentally sick was due to faulty hygienic and nutritional conditions prevailing in mental hospitals and not to mental disease of the patients. He, of course, based his opinion on the then prevailing maize theory as the etiology of pellagra, a theory which was advocated by Massari in 1810. Reiter and Jakobsen have investigated the problem of pellagra in psychoses, especially in dementia præcox. Their own material consisted of 955 inmates in a psychiatric hospital. Among them were 47 cases with alcoholic psychoses, 29 with senile psychoses, 43 psychopaths, 31 epileptics, 110 cases of general paralysis, 81 cases with manic-depressive psychosis, 15 cases with chronic encephalitis and 589 dementia præcox cases. The examination of this material revealed pellagroid dermatoses in 182 cases or in 19.3 per cent. The encephalitic group showed the highest percentage of 60, while in the schizophrenic group the percentage was 21.4 and in the manic-depressive group 8.6. Of the entire group only 14 cases were considered as true instances of pellagra. The authors made a control study of 881 inmates in penal institutions, where the living conditions are approximately the same as in the mental hospitals with the possible exception that the dietary regimen, especially as to the vitamins content, is probably of lower quality in the penal institutions. In the control group pellagroid dermatoses were found in 4.5 per cent as compared with 19.3 per cent among the psychiatric cases. It is of interest that other types of dermatoses were more prevalent among the prisoners than among the insane.

Of the 14 patients with pellagra 12 belong to the dementia præcox group, 1 is a case of manic-depressive psychosis, and 1 is an encephalitic. The case with encephalitis showed the typical extensive polymorphous type of dermatosis without, however, the other symptoms of pellagra. The authors feel that this type of dermatosis, which one sees frequently in encephalitis, has no relationship to true pellagra, and that the condition is of central origin and probably due to a lesion in the hypothalamic region.

Two cases of schizophrenia showed the same type of skin lesion and the authors think that in all probability the condition is also of central origin.

The pellagroid symptoms in the other 10 cases of schizophrenia and in the case of manic-depressive psychosis are probably of the same origin as in the previous group but may also be the expression of a true pellegra of enterotoxic origin or avitaminosis. The last possibility, the authors feel, should be considered especially in the case of the manic-depressive patient who went through a severe gastro-intestinal illness. The authors believe that the pellagroid dermatoses in organic reactions and in the schizophrenias are of central origin and that the possibility of involvement of the endocrine apparatus in these conditions should be kept in mind. The dietary regimen of the patients, according to the authors, has no direct relationship to this manifestation; they feel that the diet contains a sufficient amount of vitamins even in instances when the patients refuse to take sufficient nourishment and have to be tube-fed for a long time. Severe disturbances of resorption may possibly be responsible for the appearance of severe pellagroid symptoms and eventually of true pellagra, particularly in cases of schizophrenia. Gastric analyses of 112 cases with pellagroid dermatoses showed in a large number of instances gastric hypersecretion, hypochylia, achylia and especially diminished pepsin content. In 86 cases of schizophrenia the blood examination showed changes frequently seen in true pellagra such as lymphocytosis, eosinophilia, and tendency to anemia. In other cases with pronounced signs of pellagra neurologic symptoms were found in the form of extrapyramidal disturbances of motility and evidence of what Adolf Meyer has described as "central neuritis." Similar manifestations were observed by the authors in cases with intestinal disturbances due to dysentery without evidence of skin lesion. The authors feel that this syndrome is a reaction of the diencephalon to a severe enteric or hepatic intoxication, whether it occurs in dysentery, dementia præcox, or pellagra. Pellagra, according to the authors, may cause mental manifestations and may influence considerably an already existing psychosis. In cases of dementia præcox pellagra may produce a transitory clearing up ("lucidity") or transform a paranoid reaction into an euphoric amentia-like state. In a case of manic-depressive psychosis with pellagra the authors observed an "extra-pyramidal catatonic syndrome" with deterioration, and the authors, therefore, feel that pellagra may cause dementia in endogenous types of psychoses.

The authors offer an interesting approach to the etiologic and pathogenic possibilities in pellagra occurring in schizophrenia. The monograph is illustrated with photographic reproductions of the skin lesions and interesting case histories are cited.

J. NOTKIN.

THE RANGE OF HUMAN CAPACITIES. By *David Wechsler*. (Baltimore: The Williams and Wilkins Company, 1935.)

The purpose of this book, as conceived by the author, is both comprehensive and optimistic in tenor. It embraces an attempt to summarize our

knowledge regarding individual differences, "more specifically those aspects of it which bear on the limits and range of human capacities, and to draw such inferences from the data available as the facts seem to warrant." The implications of some of the conclusions are regarded as having "rather important bearings on a number of social questions with which thinkers all over the world are at present attempting to grapple. Outstanding among these, perhaps, are the status of democracy, the problem of technocracy in relation to human efficiency, and now, in a larger sense, the suggested attempts at social reorganization on the basis of abilities and needs as contrasted to geographical distributions and caste systems." While the author has not attempted to answer any of these questions, he believes that "the material contained in this book should enable those who are concerned with them to approach the subject in a more scientific and . . . more hopeful way." (p. ix.)

So sweeping a purview, even though somewhat carelessly outlined in the preface, is likely to arouse the reader's interest and expectation. In the introductory chapter, the author endeavours to re-state the major purpose by asking a number of questions which the book attempts to answer—thus seeming to give a less discursive and more concrete reason for the publication. The mathematical ability of an Einstein, the scientific intuition of a Pasteur, the poetic gifts of a Shakespeare, compared with the correlative abilities of the average man, suggest that the range of human abilities is well-nigh limitless. "Are these seemingly large differences real or only apparent? Do men really differ so enormously from each other, or are these examples of genius merely isolated occurrences, . . . offering us but little information as regards the capacities of mankind as a whole? If the differences cited are so great as the extremes would indicate, do they hold over the entire span of human capacities, or are they met with only in certain special capacities Is there a limit to human variability, and does the limit differ from one trait and ability to another, or is it equal in all directions?" Answers to these questions will, the author believes, direct our decisions regarding democracy or rule by experts, uniform versus sliding wage in industry, and many other political, ethical and educational matters.

In approaching these questions, certain difficulties arise—particularly in connection with the meaning of "capacities," the problems of measurement, and the arranging of conditions so that measures of different traits will be comparable. These difficulties are discussed at some length. The main result of the discussion is that comparatively few of the reported studies on "mental measurement" can be used; the most suitable results come from the measurement of physical characteristics and physiological function.

Having selected his data, the author then proposes to examine the Range by comparing the 999th and 2nd cases in every sample of 1000. The extremes are thus excluded as being outside the realm of general human variability; and a more representative variability ratio is thus obtained. When this procedure is followed, the ratios are such that they can be expressed by very small numbers. The most efficient individual in any given trade, for example, would be able to do only about twice as much as the least efficient member of

his group; for body temperature, the mean ratio is 1.03:1; for linear traits, 1.30:1; for motor capacities, 2.23:1; for perception and certain intellectual abilities, 2.58:1. The author propounds further a theory of multiple factors and tries to show that the differences in degree of variability among the different human traits are related to the influences or factors which underlie the degree of complexity of these abilities; but his data are inadequate to do more than suggest such a theory.

The author agrees, of course, that a phenomenon such as "genius" is important to human progress, even though he has purposely omitted the extremes in calculating the range-ratios. His main conclusions, however, center around the demonstration that range of talent appears remarkably small when evaluated by this means.

A critique of the book would demand a great deal of elaboration. Much technical material is involved. The logic of measurement is basic to his whole thesis. Undoubtedly the discussions presented suffer from too little systematization—so necessary when the scope of the discussions is extremely wide. Further, the main point of the argument could be made more incisive if the questions raised at the beginning were more definitely answered at the end; and if the bearing of the thesis on social and other questions were indicated in more than a superficial way. The whole book is a strange mixture of erudition and error; (π is erroneously defined, for example, in at least two places); of sweeping generalization and careful attention to detail. One detects a motivating interest in social uplift, and at the same time a strange avoidance of many of the most pertinent points. Even though the author acknowledges that a slight difference (as statistically or conceptually expressed) may be enormously significant in its effect, he argues somewhat academically in order to bolster up his thesis of human mediocrity and uniformity. Ratios expressed by small numbers may suggest comparative homogeneity among human beings; but if the same care had been exercised in examining the bases of comparing these ratios with significant social variability, as was evidenced when "different human traits" were discussed, the argument of the book might have been entirely changed. It is a stimulating book; but too comprehensive to be consistently good.

W. LINE,
University of Toronto.

PROBLEMS OF PSYCHIATRY AND PSYCHOPATHOLOGY. *By many contributors.* Prof. S. N. Davidenkoff, Editor-in-Chief. Dedicated to Prof. N. P. Bruchansky upon his completion of 20 years' activity in the psychiatric field. (Moscow: U. S. S. R., 1935.)

This is a volume of over 700 pages consisting of 59 contributions on various phases of psychiatry by colleagues and former students of Prof. Bruchansky. In a preface the Chief Editor refers to it as a collection of essays in which is reflected the contemporary psychiatric thought of the Soviet Union in all its various ramifications.

Reports have reached us from time to time of new and startling developments in the field of psychiatry in the Soviet Union. We hear of a great

reduction, almost a disappearance, of manic-depressive psychoses; of closing of mental hospitals, or their conversion to other purposes, for lack of mental patients; of an almost total elimination of prostitution, associated with a reduction of syphilis and, with it, of neurosyphilis; of unprecedented success in dealing with the problems of alcoholism and drug addictions; of similarly unprecedented success in dealing with problems of juvenile delinquency and adult criminality; etc. We turn, therefore, with special interest to this volume for more concrete information on these matters.

Is there acceptable statistical evidence in support of the above-alleged achievements? If so, are they to be attributed to the new social and economic regime, or to new practices of institutional administrations, or to scientific progress in the field of psychiatry?

The volume before us throws but scant light on the above questions which, from the western point of view, would seem to be of the highest interest: as it has evidently been compiled without reference to such questions.

One gains distinctly the impression that the status of psychiatric science in the Soviet Union lags behind that of Western Europe and this country. At best, in this collection, one finds descriptions of special observations, as, for example, that of a characteristic type of delirium occurring in cases of typhus fever, generally on the eighth day, which seems to be a day of a sort of crisis in that disease.

Most of the contributions abound in unrestrained speculation such as, unfortunately, has characterized psychiatric papers everywhere. However, the tendency toward such speculations is evidently dwindling in the western part of the world, whereas it seems to be still in full bloom in the Soviet Union. For the bulk of fundamentals in psychiatry, such as they are, the Soviet workers in the field resort to borrowing from Germany and France.

The volume, nevertheless, contains at least two contributions of outstanding practical interest, namely, those dealing with the care and treatment of alcoholics. This matter is reported in sufficient detail to present a fairly comprehensive view of the underlying plan.

The first feature of the plan is that no case of alcoholism which is sufficiently marked to interfere with productive activity in industry, agriculture, or civil service, is left without medical attention.

Psychiatric investigation and treatment is first undertaken in ambulatory clinics established throughout the country either especially for that purpose or as departments of general clinics. The patient, in the meantime, continues on his job.

If this fails, the patient is transferred to another type of ambulatory clinic which possesses in addition to the clinic equipment and personnel, a group of shops, or small industries, or truck gardens with a staff of vocational instructors. Occupational therapy is used under psychiatric direction but with full compensation for the work accomplished by patients.

If this, too, fails, the patient is transferred to a special hospital in which he is interned for an indefinite period. But here again the work cure represents the principal feature of treatment, and the institution has not only its own shops and other facilities for that purpose, but also an affiliation with

neighboring industries or collective farms where selected patients are employed.

Psychotherapy is also practiced in connection with alcoholism, but in a peculiar way. The object of both ambulatory clinics and hospitals seems to be to separate the patient from his alcoholic associates and to put him in the midst of a social environment where alcoholism is in bad taste.

Cultural activities, theatre, and other diversions are provided to fill the waking hours.

The papers in the book which deal with this matter are in modest and conservative tone and are devoted rather to outspoken criticism of the shortcomings and imperfections of the plan of operation and to suggestions for its further improvement. This plan was initiated in Moscow in 1924 and has since been introduced throughout the country. Eleven years is not a long time for such a development. It would seem that the psychiatrists who are connected with it are justified, under the circumstances, in looking forward to a definite disposal of the bulk of the problem of alcoholism in the Soviet Union.

AARON J. ROSANOFF.

OUTLINES OF GENERAL PSYCHOPATHOLOGY. By *William Malamud, M.D.*
(New York: W. W. Norton & Company, 1935.)

According to the author, "The purpose of an outline of this type is to present the general features of the subject. It lays no claim to an exhaustive discussion of the various ramifications of the specialized investigations in the field of psychopathology."

The most interesting part of the book is the author's attempt at a new formulation of personality structure. He assigns to the personality three qualities: "self-assertion," "accretion," and "ratiocination." Under these three headings the author describes various personality traits. After this there follows a discussion of some of the disturbances of these three functions.

There are obviously any number of ways of formulating personality, and, in the reviewer's opinion, such formulations are to be looked upon merely as tools. If a new formulation enables us to do something with the study of personality which the older formulations have not allowed, or if it enables us to do something better than before, then it should be classed as a desirable tool and should be substituted for the older formulation. As to whether the author's formulation achieves this purpose, it is perhaps too soon to pass any judgment, although the reviewer is somewhat skeptical. It seems, however, that the author should be congratulated upon his attempt, and that all such efforts are well worth while and should be encouraged.

The material of the book is arranged in orderly fashion. First there is a general discussion of the subject with attempts at defining and limiting psychopathology. Following this are some 200 pages devoted to description of terms, followed by about 80 pages of discussion of dynamics. Then comes a discussion of personality with the author's new formulations of personality structure and the discussion of personality deviations in terms

of this new formulation. There will always be controversy as to the amount of space allotted to any particular topic. The reviewer would make the criticism that the amount of space devoted to description of terms should be reduced and additional space given to dynamics. Certain subjects are not given adequate discussion, *e. g.*, hypnotism is dismissed with 20 lines.

The whole book gives the impression of being somewhat hastily written without careful revision, and contains many inaccuracies which should have been corrected before printing. As representing a few examples of this, the following specific criticisms are given.

The reviewer does not consider that the definition of psychopathology is adequate or satisfactory. Writers like Bernard Hart have admitted the impossibility of making a clear-cut distinction between the normal and abnormal, whereas the present volume seems to find no difficulty in doing this and gives a definition which superficially is satisfactory, but which, on deeper study, seems inadequate.

In the discussion of intelligence tests we are told: "The I. Q. of the normal person varies between the limits of 90 and 105." This follows a statement of mental age of 16 as representing an intelligence quotient of 100. While one might argue that, for the child under 16, this would be normal intelligence, it is not in accord with the findings for adults which indicate that average adult intelligence is a mental age of 14 years and an intelligence quotient of 87 (using 16 years as a basis).

We are also told that there are two types of persons whose intelligence is below normal: "(1) That of the congenitally feeble-minded person whose lack of intelligence is due either to a faulty original endowment or to some disease process which has occurred in early infancy." This sentence is perhaps an excellent illustration of the careless manner in which the book is written.

Again we are told: "The psychoneurotic woman may, in the manner of Lady Macbeth, protest too much, may go to great lengths in telling us how much she is in love with a person whom in her obsession she wishes to murder." A careful perusal of Macbeth gives the reviewer no evidence of such behavior on the part of Lady Macbeth. Presumably the author had in mind the quotation from Hamlet—"The lady doth protest too much methinks."

The discussion of compulsive acts does not seem to the reviewer to conform with the general opinion of psychiatrists as to what should be called a compulsive act. To speak of organically determined behavior, such as the oculogyric crises, as a form of compulsive behavior, and to include certain habitual and accustomed acts, such as the posture in which one lies when going to sleep, gives a meaning to this term which is rather different from the way the term is usually used.

The discussion of Kretschmer's physical types seems somewhat at variance with the material found in Kretschmer's book, *Physique and Character* to which the reader is referred at the beginning of the discussion. According to the writer Kretschmer divides persons into four physical types: (a) "the pyknotic" (*sic!*), (b) "the athletic," (c) "the leptosome," and

(d) "the dysplastic (hypoplastic)." We are also told: "The *asthenic* type is essentially similar to that of the leptosome, but is probably somewhat more extremely narrow in its measurements." It does not seem to the reviewer that this is a correct presentation of Kretschmer's views, and it seems worth while to quote from Kretschmer's book the following statement: "With the methods we have discovered three ever-recurring principal types of physique have emerged from our clinical material, which we will call 'asthenic,' 'athletic,' and 'pyknic.'"

Any discussion of psychoanalytic formulations is bound to stir up controversy. The author states that he is giving "a brief presentation of only the most essential features," and refers the reader who desires "a thorough knowledge" to four books, one by Karl Abraham and three by Freud. One would assume, therefore, that unless it were otherwise stated the presentation would follow the orthodox views of Freud. Apparently, however, the writer makes a number of changes but in only one instance does he state that such a change is being made. The presentation of the sexual development of the child is certainly not according to Freud and there is a distinct soft pedalling of Freud's sex theories.

The glossary does not seem to be particularly well devised and the selection of words for definition gives the impression of a very hurried, uncritical selection. Presumably the book is intended for persons with average intelligence and education, yet some extremely simple words are defined and others equally important, or slightly more difficult are left out. Some of the definitions are quite incorrect, others inadequate. We are given: "Par—a prefix denoting disturbed function"; whereas the Greek prefix is *para*. We are told that a multigraph is "an apparatus which permits simultaneous records of the pulse, blood pressure and respiration"—obviously intended for polygraph, but an example of the inaccuracies which have crept into the book. The reviewer does feel that to define "coma" as "loss of consciousness," "delusion" as "a false belief," or "psychoanalysis" as "a method for the treatment of certain types of mental disease" is to give an inadequate or unsatisfactory definition of these terms.

There has been a definite need for a book which will cover the subject of general psychopathology in a clear, simple fashion so that it would be suitable as a textbook for medical students, social workers, and other students. With a knowledge of the author's broad experience and wide interests, the reviewer had hoped to find in this book the answer to this demand. After going through the book, however, the reaction is rather one of disappointment. The book has many good features. It contains a great deal of valuable material, but on the whole the reviewer would say that the book does not measure up to what the author is really capable of producing, and that, in its present form, it is too loosely and inadequately written to be satisfactory. A careful revision, however, should greatly improve it and might bring it to the level of a satisfactory reference book on the subject.

KARL M. BOWMAN.

OBJECTIVE AND EXPERIMENTAL PSYCHIATRY. By *D. Ewen Cameron, M.D.*
(New York: The MacMillan Co., 1935.)

This unusual book is composed for the greater part of summaries and well written discussions of the results of laboratory studies on psychotic patients. These, with the appended bibliographies, may be useful in providing a quick orientation in the fields considered. But the book is not a mere compilation of the literature. It is a treatise on methodology. The purpose, as announced on the dust cover, is "to bring together in readily accessible form the natural evolution of a science toward quantitative methods, toward experimentation as the main method of fact finding."

The author's meaning is made clearer in the detailed discussions, where instrumental quantitation is repeatedly and emphatically stressed and direct clinical observation systematically treated with disdain because of "the serious errors of conventionalisation and projectionism which permeates (*sic*) the observational method." In his preface the author states that "we are now in a fair way to realize our dream of analyzing human behavior objectively, dispassionately, and, above all, of being able to predict and control." That the book fails to substantiate this ideal will not surprise readers acquainted with the present status of psychiatry. The natural evolution of psychiatry toward quantitative methods is still an idealistic dream or a superficial pretense rather than an accomplished fact.

In the reviewer's opinion, the more significant and effective portion of this book is in the first two chapters, which present, under the rather banal title of "Experimentation and Quantitation in General," some radical but well-founded criticisms of conventional psychiatric assumptions. Terse statements are difficult to find, but these quotations from pages 18 to 22 indicate the general drift:

"With the exception of a few schools of thought, the main effort in psychiatry is devoted to a projectionistic study of consciousness On the false premises that consciousness represents a short cut to the study of mentation we have erected an etiological system, the authenticity of which is to say the least doubtful."

"We find few reaction types in which 'mental stress or strain, worry, anxiety, tension or conflict' are not cited as the etiological factors"; yet, "when bereavements, separations, financial loss, fear, and conflict involve large numbers of people no increase in the number of persons admitted to mental hospitals is to be observed."

"Those things are observed and those phenomena are inquired after that are already considered to form a part of the orthodox concept of the reaction under observation. In this way erroneous concepts become more and more firmly entrenched. . . . The patient too has conventionalized his reactions."

To remedy this state of affairs the author offers the methods of experiment and quantitation. This proposal will probably meet no aggressive opposition but rather a weary indifference, as a sophomoric counsel of perfection.

It is cause for regret that the author does not advance more positive suggestions for the improvement of clinical observation, for which task he should be qualified by his training and insight.

J. C. WHITEHORN.

MENTAL HEALTH—ITS PRINCIPLES AND PRACTICE. By *Frank E. Howard, Ph.D.*, and *Frederick L. Patry, M.D.* (New York: Harper and Brothers, 1935.)

Here is a book which leaves the reviewer in conflicting states of mind. It is a long book and it purports "to help the student and professional worker (educator, physician, nurse, social worker, lawyer, clergyman, etc.)" Mental hygiene is a large subject and one which, no doubt, cannot be covered in any thorough way in a short book and yet we could wish for a little more in the way of terseness. And we wonder whether mental hygiene is not so broad a subject, with so many phases, that it is impossible to write a general book which will be helpful for anyone no matter in what phase of it he may be interested.

The early and more general chapters contain a great deal of valuable material with suggestions for further reading at the end of each chapter. There are also lists of questions after each chapter. These, we suppose, suggest the text book possibilities of the volume but we are not quite clear as to just what groups would find it satisfactory in this regard. There is great need of text books in mental hygiene but it is at least open to question whether the present book satisfactorily meets the need.

Several chapters are devoted to the psychoses, the psychoneuroses and behavior problems and we are introduced by the authors to the psycho-biological point of view of Dr. Adolf Meyer. But here again we feel that in these chapters the authors display some confusion as to just whom their book is intended for. If the book is intended for psychiatrists, then the use of a great number of Greek terms which Dr. Meyer has coined is perfectly proper and makes for clarity and precision. But if the book is chiefly for those not trained in psychiatry we think nothing is gained and much lost by the use of such terms.

While a good deal is said as to how an understanding of the patients' problems may be gained by the use of histories, rating charts and other devices, it would seem that more might have been said on the treatment to be applied after such knowledge has been acquired.

The usefulness of the book would have been increased by a more complete index.

H. B. SPAULDING,
Toronto.

WAYWARD YOUTH. By *August Aichhorn*. (New York: The Viking Press, 1935.)

With the protagonists of Freud and his methods still able to produce a high state of emotion in those who hold other views it is a pleasure to read a book by a Freudian practising in Vienna which, we feel, will offend non-Freudians very little if at all.

The author undoubtedly has personality, which he is able to convey to his readers even through a translation. We read his book and we look at his photograph on the dust cover and are convinced that here is a man who

would be helpful to delinquents and patients whatever school of psychiatric thought dictated his methods. The author's ability all through the book to make his meaning clear through illustrative case material results in a very readable and interesting volume.

The early chapters deal generally with the causes of delinquency. We are given, in case form, the methods used in analyzing symptoms and getting to the root of cause of delinquent behavior. We gather that a complete analysis is made only in the cases of those neurotic dissocial delinquents who are so incorrigible that no group will associate with them. The method used is rather that of the interview with the psychiatrist utilizing Freudian theories and concepts to interpret behavior and indicate treatment. There is a chapter on the *transference* which is regarded as of great importance and which often seems to be achieved with almost lightning rapidity. One wonders whether Dr. Aichhorn's *transference* is anything more than the ordinary *rapproch* which all psychiatrists strive for.

The chapters on his methods in the training school for delinquents, of which he is director, are particularly interesting. Here, again, we feel that in a large measure his success is personal rather than due to his psycho-analytic methods. He emphasizes quality and attitude of personnel, the necessity for making an institution conform to an actual social community, rules which are for the good of the inmates rather than for administrative convenience, etc. We should like to hear more of his methods of dividing delinquents into groups in the institution on which he has apparently done a great deal of thinking and experimenting. His chapter on a group of a dozen aggressive boys which no other groups would assimilate makes good reading. In the early weeks of their stay in the institution they were apparently not interfered with except to prevent serious physical injury, and when they were later moved to other quarters there was little in the way of furnishings or windows from which to move them. The theory was that if their aggressive tendencies were not opposed they would reach a climax and then something might be done. It seemed to work.

The author believes that more might be done in the way of creating and then making use of emotional experiences with delinquents. He thinks when more is known of the possibilities in this direction it may be possible to shorten institutional training considerably in some cases. There may be interesting possibilities here and we hope that we may hear more from Dr. Aichhorn on this, as well as other phases of work with delinquents, in future books.

H. B. SPAULDING,
Canadian National Committee
for Mental Hygiene.

GUIDING YOUR CHILD THROUGH THE FORMATIVE YEARS. By *Winifred de Kok*.
(New York: Emerson Books, Inc., 1935.)

This little book is addressed to the educated mother who has to look after her own children and is based on the author's experiences with her own two children.

It is written in simple language and the principles of mental hygiene are clearly expressed. The chapters on birth, sex and excretion are written from a psychoanalytical viewpoint, but in general the advice throughout the book is eminently practical. The affective life of the child is discussed objectively and practically and the work should serve the purpose for which it is intended. It should be useful also to workers in child guidance clinics.

S. G. CHALK,
Mental Health Clinic,
London, Ont.

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE
OF THE UNITED STATES FOR THE FISCAL YEAR 1935. (Washington: U. S.
Printing Office, 1935.)

"The protection of the public health is an essential function of government." These significant words from the annual report of Surgeon General Hugh S. Cumming may be taken as the keynote of the dramatic story which emerges from the matter of fact statements in this compact volume of 158 pages covering the activities of the 137th year of the Public Health Service of the United States.

His report is of particular moment this year as it is the last which will bear Dr. Cumming's name as the head of the service. Surgeon General Cumming has been an officer of the Public Health Service since 1894, and was appointed to his present post by Woodrow Wilson in 1920. He retires from active service on February 1, 1936.

The tremendous growth and increase in importance and influence of the Public Health Service under Dr. Cumming's directorship are amply demonstrated by perusal of the successive annual reports. In a letter to the retiring Surgeon General President Roosevelt said:

"Your release from active duty marks the rounding out of a career in the public service which the American people can view with pride and admiration because of the honor you have brought to them as their faithful servant and benefactor. You, yourself, may view it with the most thorough satisfaction in a task well done.

"I am happy to recall that your labors in protecting humanity against disease and in advancing health standards everywhere have brought you deserved recognition and honor not only in your own country but throughout the world."

The present report referring to world health conditions during 1934 indicates an increase of cholera and plague in Asia as compared with 1933, an increase of typhus fever especially in Eastern Europe, and a marked decrease in fatal cases of smallpox throughout the world.

In the United States the tuberculosis mortality rate continued to decrease and the 1934 rate (56.2 per 100,000 population) was the lowest ever recorded. The continued lowering of the death rate in typhoid fever and diphtheria is one of the spectacular achievements of modern public health science. In 1920

the typhoid fever death rate in the United States was 35.9 per 100,000; the diphtheria rate was 43.4. The death rate for each of these diseases in 1934 was 3.3 per 100,000 population. Neither cholera nor yellow fever appeared in the United States during the year.

An interesting finding is a slight turning in the tide of the declining birth rate which has been steadily dropping for the past twenty years. In 1915 the birth rate was 25.1 per 1000 population; in 1933 it reached a low of 16.6 per 1000; in 1934 it rose to 17.1, a slightly encouraging sign although nothing to justify the government in raising the issue of colonial expansion.

The effectiveness of the quarantine services is reflected in the brief and eloquent statement: "None of the quarantinable diseases was imported into the United States during the year under report." The scope of this service is seen in the fact that during the year quarantine officers inspected 15,262 vessels, and 1,924,556 persons.

One of the problems which gives the Surgeon General concern is that of venereal disease. He estimates that there are approximately 518,000 new cases of syphilis and 1,555,000 of gonorrhœa arising annually within the United States. "On the basis of present morbidity reports syphilis and gonorrhœa represent 20 percent of all communicable diseases. Venereal diseases are as serious and as crippling as other communicable diseases, but funds are not allocated for their control in an amount which nearly approximates 20 percent of all allocations available for the communicable diseases in general."

In the report of the division of mental hygiene, under the Assistant Surgeon General Walter L. Treadway, the outstanding feature was the opening on May 25, 1935, of the first United States Narcotic Farm at Lexington, Kentucky. This institution which presently provides for men only has a thousand bed capacity. Provision for women addicts is contemplated for the future. On June 30, 1935, there were under care at the Lexington Narcotic Farm a total of 280 inmates, most of these being addict prisoners transferred from the federal prison system. There are also received cases probated from the courts and persons voluntarily seeking treatment. The second narcotic farm at Fort Worth, Texas, is in process of being developed.

These two institutions complement each other and are designed to provide for somewhat different types of case. The institution at Lexington will care for the more intractable cases, largely of the prisoner group, for whom the custodial features of care require emphasis. The narcotic farm at Fort Worth will be more open in character, built on the cottage plan, with the custodial features less in evidence.

The Public Health Service is charged with supplying medical and psychiatric services for the federal penal and correctional institutions; and it is worthy of note that during the year the Attorney General requested that the psychiatric service be extended to all federal courts.

C. B. F.

In Memoriam.

HERMAN MORRIS ADLER.

1876-1935.

With the passing of Herman Adler our profession has lost a member who did much to enlarge its scope of influence. With sound imagination and large vision he successfully guided psychiatric work into almost untrodden fields.

Adler came from a distinguished family. His father, Isaac, was a scholarly physician of wide practice in New York. His uncle, Felix Adler, the founder of the Ethical Society, was one of the great modern leaders in philosophy and education. After Herman graduated from Harvard in 1897 he entered the field of medicine, receiving his doctorate degree at Columbia in 1901 and studying abroad in Strassburg and Berlin. Then he worked in neuropathology and biochemistry at the Harvard Medical School, becoming an assistant and then an instructor. Associating himself with Southard who inspired so many young men to go into psychiatry he began in that field at Danvers State Hospital and in 1912 became chief of staff in the Boston Psychopathic Hospital and assistant professor of psychiatry in the Harvard Medical School.

For the National Committee for Mental Hygiene under a grant from the Rockefeller Foundation, Adler in 1916 made a survey of public facilities in Chicago and Cook County for the care of mental defectives and the mentally diseased. This was a step in the direction which led to his great service for psychiatry and for public welfare. When the present writer went to Boston in 1917, Adler was chosen as head of the Juvenile Psychopathic Institute which later became the Institute for Juvenile Research. The next year Adler, ranking as major in the Medical Corps, U. S. A., was studying disciplinary cases at the military prisons. In 1919 he returned to Chicago and began laying the foundations of a state-wide clinical psychiatric service which was unique and remains a memorial to his capacity for organization.

It was in the field of social psychiatry that Adler found scope for his remarkable abilities; he was able to persuade the powers

that be of the values of this branch of psychiatry and single handed he won great backing for his ideas. Before long the Institute was on a budget of over \$160,000 a year from the State of Illinois and in 1926 the Behavior Research Fund with Adler as director was established with \$50,000 a year from private sources. Adler then surrounded himself with men of high scientific attainment, Lashley, Darrow, Shaw and others, and from this research coterie have come some of America's most notable productions in brain physiology, clinical psychology and criminology.

Adler in the meantime became professor of psychiatry at the University of Illinois and state criminologist, and remained as director of the Institute until he removed to California in 1930. In California he was welcomed as professor of psychiatry in the University of California and as adviser to the Department of Institutions.

This is a remarkable career for the slight, frail man whom we knew as making for many years a most valiant fight against ill health. Adler with his organizing genius and his far-sighted outlook upon the implications of psychiatry for social service was a dynamo of mental energy. Moreover, with ever ready logic he was a most persuasive force in the community. From the beginnings of psychiatric work in the Juvenile Court he extended it into school systems and correctional institutions. The present diagnostic clinics of the Illinois prisons which represent a tremendous forward advance in the treatment of prisoners, as it exists under Dr. Schroeder, was an outgrowth of Adler's planning. Other notable pieces of work can also be credited to Adler, such as his contribution to the criminal justice survey of the Cleveland Foundation and his consulting work for the Harvard Survey of Crime and Law. His was the moving spirit in founding the American Orthopsychiatric Association.

Adler's membership in a wide range of scientific societies and the list of his publications represent the shift of his developing interests from biochemistry and pathology to the field of clinical psychiatry which he so aided to expand.

In 1917 Adler married Frances Porter of Chicago; his wife and their daughter, Frances, survive him.

WILLIAM HEALY.

GEORGE HUGHES KIRBY.

1875-1935.

Dr. George Hughes Kirby, one of the outstanding psychiatrists of this country, and president of The American Psychiatric Association during 1933-34, died of coronary thrombosis on August 11, 1935, at Portsmouth, New Hampshire, where he had been spending his vacation.

Born in Goldsboro, North Carolina, February 9, 1875, Dr. Kirby was the son of George L. and Mary Green Kirby, the father a physician and during Dr. Kirby's young manhood, superintendent of the state hospital at Goldsboro, N. C. Those who had the privilege of knowing the members of Dr. Kirby's family recognized the heritage that had come to him as exemplified in their gentle courtesy, consideration of others and high ideals. Because of his father's interest in, and experience with mental disorders it was perhaps to be expected that Dr. Kirby would show a trend of interest in a similar direction and this expectation was borne out when after being graduated from the University of North Carolina in 1896 and from the Long Island College Hospital in 1899, Dr. Kirby entered the field of psychiatry by becoming associated with Dr. Adolf Meyer at the Worcester State Hospital. There he remained until Dr. Meyer became director of the New York State Psychiatric Institute on Ward's Island and Dr. Kirby came with him as associate in clinical psychiatry.

During the years 1902-1908 when Dr. Kirby was associated with Dr. Meyer in organizing scientific methods of care and treatment and investigation in the New York state hospital service and later during the years 1909-1917 when he was clinical director of the Manhattan State Hospital on Ward's Island, Dr. Kirby left the imprint of his scientific and humanitarian principles and ideals on countless physicians who came in contact with him during these periods and who received the benefit of his advice and assistance in their professional careers. Distributed not only through this country but abroad, are many men who have carried on during subsequent years the tenets that he adhered to. Succeeding Dr. August Hoch as director of the Psychiatric Institute in 1917 Dr. Kirby creased the influence of the Institute and of the state hospital service by courses of instruction, hospital conferences and visits to

the state hospitals that were carried on during his directorship; the personnel and activities of the Institute in clinical studies and in research were extended and Dr. Kirby's development of the malarial treatment of general paresis at the Institute and subsequently throughout the state hospital service was an outstanding contribution to psychiatry. It is impossible to estimate adequately the benefits that have been derived by thousands of patients from his initiation of this form of treatment.

The planning, development and organization of the Psychiatric Institute and Hospital as a part of the Presbyterian-Columbia Medical Center demanded not only much thought but physical effort, which Dr. Kirby gave unstintingly and untiringly, undoubtedly with detriment to his health. So much so, that before he could see the culmination of his plans in the opening of the Institute, his health had already suffered to such an extent that he was unable to take as active a part as he wished and his friends desired for him, although he insisted on carrying many burdens which the new hospital entailed. It is recognized not only in this country but abroad, that the present Psychiatric Institute and Hospital stands and will remain as a monument to Dr. Kirby's foresight and wisdom in its physical planning, its equipment and organization for research and teaching. Not only is it an outstanding credit to the state but its part in medical education and particularly in psychiatric education is an outstanding one, excelled by none other in this country and this living, active monument to its originator and developer should remain as a source of pride to his family.

Dr. Kirby was professor of psychiatry in the New York University and Bellevue Medical College from 1914-1917, professor of psychiatry at Cornell University Medical College from 1917-1927 and professor of psychiatry in the College of Physicians and Surgeons of Columbia University from 1927-1933.

He had served as president of the New York Neurological Society, the New York Psychiatric Society, the New York Society for Clinical Psychiatry and The American Psychiatric Association. In addition, he was a fellow of the New York Academy of Medicine and a member of the American Neurological Association and the American Psychopathological Association.

In July, 1918, Dr. Kirby had been commissioned major in the Medical Corps of the United States Army and was attached to

the staff of the surgeon at the Port of Embarkation in New York City. He was later appointed chief of the neuropsychiatric service of the United States Army Hospital No. 1 in New York City and he took a major part in the organization of the special units for the care of returned soldiers suffering from nervous and mental disorders. He received his discharge from active service in March, 1919. He was later consultant in neuropsychiatry to the United States Public Health Service with the rank of senior surgeon and he was appointed by the Secretary of the Treasury, a member of the Board of Consultants to develop hospital facilities throughout the country for ex-soldiers. He was a member of the Medical Council of the United States Veterans Bureau.

Dr. Kirby was a member of the Southern Society and of the fraternities of Sigma Chi, Alpha Kappa Kappa and Phi Beta Kappa.

Dr. Kirby was also closely associated with the National Committee for Mental Hygiene, serving on the Board of Directors and the Executive Committee and being very active on the War Work Committee.

He had been associate editor of THE AMERICAN JOURNAL OF PSYCHIATRY, of the State Hospital Quarterly and the Psychiatric Quarterly for many years.

After his retirement from the directorship of the New York State Psychiatric Institute and Hospital in 1931, Dr. Kirby had engaged in private practice and was appointed professor of clinical psychiatry at the Cornell University Medical College, a position he held at the time of his death.

Dr. Kirby is survived by his widow Jeanette K. Kirby and daughter, Jeanette V. Kirby.

Throughout his professional career, Dr. Kirby evidenced outstanding qualities of patience, consideration, courtesy, soundness of judgment that attracted to him all the colleagues and associates who had the privilege of knowing him, and his patients with whom he was always sympathetic and helpful in his approach. Never was he carried away by unsound enthusiasm for the moment; his judgments and conclusions were based upon fact, after careful deliberation. It was these qualities that made him one of the outstanding psychiatrists of the country and his loss to psychiatry is great.

CLARENCE O. CHENEY.

